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I.—*Analysis of the Copper Grant in possession of the Jews of Cochin. By the late* F. W. Ellis *of the Madras Civil Service.*

[Since the publication of No. 30 we have met with the following translation of the Jewish Sasanam by the late Mr. Ellis among some old papers in the College. The general interest of the subject and the high character of Mr. Ellis as a critical oriental scholar, will it is hoped be accepted as a sufficient apology for recurring to a subject which has already been so ably illustrated by Mr. Gundert, from whom also we have received a further highly valuable communication fully bearing out his happy suggestion of the true meaning of *Anjuwannam*. Mr. Gundert has likewise most kindly at our suggestion, furnished a translation of the Hebrew version of the Sasanam retained by the Jews, who have long lost all power of deciphering the original. This, with the facsimile of the deed itself made from an impression of the copper plates struck off at the Cottayam Press, with which we have been kindly furnished, renders this subject complete.]

സ്വസ്തി ശ്രീ

'Swasti Srí!' An invocation or salutation (namascāram) This phrase is found to head all inscriptions and ancient deeds on copper or stone, in Malabar. In the inscription it is written

in the Grantham characters: used by the *Tamuler* for the *Sanskrita* Language.

கோகோன்மை கொணடான்.

'The king of kings hath ordained it,' கொ and கொன mean, *a king;* the latter word would be used before a vowel, as in the present instance அமை is from அமைத்தல் which in the *Sadur agaradi* (*Tamil* dictionary) is interpreted by சமைத்தல் - செய்தல், *making, ordaining*; thus in the *Trivannoor* inscriptions we have திருவைக்கிரத்தின் அமைஞ்ஞபூமி 'The land ordained, *set apart, appropriated,* for (supplying) an *agram* (*Sanskrita*: food for *Brahmans*).' அமைகொணடான; a compound in the 3d person of the preterite sense. The sentence, embraced between two marks, should contain a date of which more will be said in an another place.

ஸ்ரீபாற்கரன இரவிவன்மர்

'Sri Bháskaran Iravi Varmar' This is the name of the Prince. Bháskara, *the sun,* is written here in the *Tamul* characters பாற்கரன், The name of the 'Sun' is a common title given to Sovereign *Indian* Princes. In the present instance it is doubled; for இரவி (the *Tamil* mode of spelling the *Sanskrit* word *ravi,* (for *r* never properly begins a Tamil word,) also means *the sun.* *Varmar* is the title of Kings, as *Sarmar* is of the Brahmans. The termination is of the idiom of the *Tamuler.* These also write and spell the word வன்மர் *vanmar,* so also in ancient inscriptions I find தன்மம் and கன்மம் for *dharmmam* and *kharmmam;* as in the inscriptions in the *Avenashy* and *Denaikan-cottah* pagodas, in Coimbatoor country, which are written in the ancient Tamil character; an alphabet quite distinct, and different from the Jew's inscription, and others, those in Malabar.

திருவடிவல்

'(his) auspicious Foot!'

The feet of *the King, Preceptor, the Deity &c.* is always addressed. The exact force of the word வல annexed to திருவடி

I do not exactly know; but I leave it as I find it; it being authorized by the repetition of the phrase in numerous inscriptions that I have examined.

ஆறுபிரத்தாணடும்.

'In a hundred thousand places' i. e. Throughout an extended empire. The *Raja* appears to have been a Prince paramount. In this inscription at the end are cited, as witnesses, the names of numerous chiefs of minor principalities in Malabar. The word ஆணடு which occurs in this passage has three meanings, viz. *place, a year,* and *a cycle* [that] *of* [sixty] *years.* Each meaning by a playfulness common to *Indian* writers are introduced in this passage, in the succeeding sentences.

செங்கோல்நடத்தியாளாநின்ற

'[when] weilding the sceptre, *or administering justice,* was reigning,'

செங்கோல் is *the sceptre of authority;* it also means நீதி *justice* [Sadur agaradi] யாளாநின்ற is the present participle.

யாண்டு இரண்டாமாணடைக்கெதிர்

'The year above the second Cycle.'

முபபத்தாறுமாண்டு

'The thirty-sixth year.'

முயிறிக்கொட்டு இருந்தருளியநாள்

'On the day that he tarried at Muyiri Kótta,'

Here the word அருளிய is used honorifically, as spoken of a high personage.

பிரஸாதிசசருளிய பிரஸாதமாவது

'The act of Grace which he was pleased to vouchsafe;— *to wit;*' In the word பிரஸாதம *joy, pleasure,* the Sanskrit *s,*

and long mark for ā, are retained; the latter is the same mark as that for the consonant *r* as in modern *tamul* letter ர for *r* and also for *ā* when conjoined with consonants. The word அருளிய is again introduced. The expression பிரஸாதமாவது has its termination formal and quite correct.

ஈஸ்ஸுப்பு இறப்பானுக்கு * * * * * கொடுத்தோம்

'To Issoopoo Irabbán * * * we have given *(allowed, permitted,)*' These are the *first* and *last* words of the second sentence of the Inscription. The first sentence may be rendered as follows; "The gracious act vouchsafed by the SovereignPrince Bháskara Iravi Varmar, in the 36th year of the 3d cycle, when tarrying in state at ***Muyiri Kótta*** : to wit."—The context of the second sentence is, 'we have given or allowed *so and so* to Joseph Rabbán.' Thus the name would be properly written in English. The vowel *i* before the word *Rabbán* is the *Tamul* idiom. The double *ssu* in *Joseph* is of the *Grantham* character. Thus it appears that the individual named here was not (merely) a ***Rabbi*** or ***Rabba***, but dignified by the title ***Rabbán***, the title, I understand, of the highest grade of the Jewish priesthood. The word *give* means here simply *to allow*, to permit; as it must often be understood in most of the *Indian* languages. In the *hiatus* kept in the last extracted sentence are embraced in detail *the privileges allowed*, composed of, in general, simple terms and abstract terms, kept in the nominative case, though governed by the verb *we-have-given*; and connected by the conjunctive particle உம, *and*, throughout. *Had the identical things mentioned been given, as a gift, it would certainly have been particularized, so far, by the use of the accusative case, throughout.*

The following periods contain the things privileged.

அஞ்சுவண்ணமும்

'(and) five degrees *of legitimate* title.'

This first period, seems on the outset to contain a difficulty,

in its very apparent unmeaningness, being simply *five kinds* or *degrees ;* but it is subsequently fully explained, by a double repetion, and by the express mention of *His self, his male issue, his female issue, his nephews,* and *the nephews of his daughters.* The first thing would be, as naturally appears fit, to ascertain and establish his (Issoopoo Irabbán's) title and claims in this granted act, in his own person and that of his descendants.

வெடியாலும பாயணத்தாலும பாகுடமும

' and tribute, with awe and oblations.'

பாகுடம is அரசிறை (Sadur argaradi) *tribute payed to the* Sovereign. Which the Grantee in this Act was permitted (as I understand it) to receive in his own person. The words வெடியாலும and பா (or வா) யணத்தாலும I am by no means satisfied about; they are both in the ablative or instrumental case and united by the conjective particle உம். Also வெடி means *fear* and பாயணம for உபாயணம is *reverence* and *offerings.* The expressions are not however of much importance, being merely connectives with and subservient to the word ' *tribute :*' about which no doubt can rest.

அஞ்சுவண்ணபபேறும

' and the profits (rights or enjoyments) of the five classes.'

The word பேறு which is frequently used in this document means இலாபம-அனுபோகமஅனுபவம-(Sadur agaradi) : and is in common use to this day in Malabar in publick instruments. The *five classes* [a local use or custom] is said to mean the five chief trades, *viz. carpenters, braziers, blacksmiths, goldsmiths,* and *toddydrawers.* We must be content with this explanation, in the absence of the possibility of improving our information on a mere local matter and custom of 1500 years agone. Sure however it is that the above five occupations are linked together as *the five crafts* to this day, in Malabar.

பகல்விளக்கும

' and day-lamps'

The use of lights by day is the privilege of the chapels—royal or other Pagodas. But பகல்விளக்கு has another meaning in the* details of Malabar, viz. a certain ceremony of the nature of *a Mass* performed in the Pagodas: *thus* people on ordinary domestick occasions or for penance, go themselves or send to cause the performance of a *pagel-vilakkah* as they term it: probably from burning candles being used at the ceremony. The privilege appears to be that of conducting religious observances by day or by night without molestation, where burning censors by day would interfere with exclusive privileges.

பாவாடையும

' and *long* or *broad* vests (a dress, or flowing full garment, as worn by foreigners)'

அந்தோளகமும

' and palanquins,'

குடையும்

' and umbrellas,'

வடுகப்பறையும்

' and drums, [a kind of drum.]'

பறை is a kind of musical instrument (Sadur agaradi)

காகாளமும்

' and trumpets'

காளம் or காகளம் means *a trumpet.* In the original there is an error one way: either in the repetition of the கா or in making the second syllable long i. e. கா for க; or perhaps it may have been an ancient form of the word.

* A word left out in the original, probably *religious* or *ceremonial.*

இடுவடியும்

'and tabors, (a small kind of drum)'

The term is still used in Malabar.

தோரணமும்

'and garlands [probably for the person]'

தோரணவிதானமும

'and garlands: *over the roads* &c.'

Here the word விதானம—மேற்கட்டி *fastening above* (Sadur agaradi) is annexed to the former word தோரணம, there used simply.

காரவும [or the க may be a ச and the வு may be a பு] also மிககும; What these two nouns mean, I have been, hitherto, unable to establish.

எழுபத்திரண்டுவீடு பேறும்

'and seventy-two free homesteads'

the word வீடுபேறும is a common term now in use technically in Malabar. It has the meaning simply of *house,* but with the notion of the proprietary right inherent in the term. Here, not the *free houses* are given; but rather the freedom of the houses only is guaranteed.

கூடக்கொடுத்தோம

'all together we have given'

The word கூட is merely introduced as collecting and combining all the above articles under the government of the word கொடுத்தோம. The second complete sentence ends here.

உலகுந்துலாகூலியும் விட்டோம்.

'and we have relinquished taxes and transfer—duties.'

உலகு or சுங்கம are *customs, duties;* the latter is used for

sea-customs at this day. The two terms are both derived from the *Sanskrita* ശുല്കം *sulka.* The term which I have rendered *transfer-duties*—is literally *dues-by-weight,* some local custom, not known by that name at this day.

மற்றும நகரத்தில்குடிகளகோயில்க்கு இறுக்குமது

'Moreover the taxes which are paid by the houses of the city, to the Palace.' The Palaces of the *Rajahs* in *Malabar* are called *Koyil* or *Kovilagum,* or *Kshetram,* literally *Chapels Royal. It* means here the royal exchequer called in the present day the *pandáram* பண்டாரம a word corrupted from ഭാണ്ഡാഗാരം having the same meaning. The word இருக்குமது is a participial noun of the future tense (which we render by the present) from இறுக்கிறது *to pay taxes*

இவன் இறுமையும

'his [Joseph's] not paying it [*the taxes*: by reason of his exemptions thro' this act] *and*'

பெறும

'and the [beforementioned] privileges'

அதுபெறவுமாக

'In order that he may enjoy it.'

சசெப்பேட்டோடும செய்துகொடுத்தோம

'We have executed and given it with (these) copper leaves.'

The compound செப்பேடு is from செம்பு *copper* and ஏடு *a leaf;* which united is செபபெடு; The common word in Malabar now in use is செமபொால [so pronounced: written *Malabaricè* ചെമ്പോല or in sanskrit താമ്രശാസനം *Támra—Sásanam.*]

அஞ்சுவண்ணம உடையு

(being) in five degrees :—*namely.*'

After this follows the explanation of the five degrees of persons in natural descent, who are to benefit by the grant. The form உடைய I have not met with before. It is used participially or obsoletely.

ஈஸுப்பு இறப்பானுக்கும்

'[and] to Joseph Rabbán himself,'

இவனஸநததிக்காண் மக்கள்க்குமபேண்மககளககும

'and his progeny, his male children and his female children,

இவன்மருமக்கள்ககும

'and to his nephews,'

பேண்மககளைகொணட மருமக்கள்க்கும

'and to the *nephews* of his daughters,'

ஸநததிப்பிரகிரிதி

'[in] natural succession.'

உலகும சநதிரனும் உள்ளளவும அஞ்சுவண்ணம ஸந்ததிப்பிரகிரிதி ஸ்ரீ,

'an hereditary succession in these five degrees, so long as the earth and the moon remain. Srí!'

After this there follow the names of several Kings or Princes in Malabar who are cited, to recognise the act; and the name of these personages are still to be found in the titles of the *Swarúpas* or dynasties, presently in the Province of *Kérala*. Each title is introduced by the phrase,

இவ்வரிஅறிவேன

'I know (acknowledge) this Deed.'

Here இவ்வரி is the proper form for இந்தவரி as usual; வரி is literally *a line,* but is used for *a writing,* and technically for *a deed.* [The repetition of this sentence before each name will be avoided here.]

வேணாடுடையகோவர்த்தனமார்த்தாண்டன்

‘ Góvarddhana Marttándan (the Prince of Vénádu ; *now called Vénátta-kara.*’

‘ Kotai Srí Kanthan of Vénápalináda ; *now called Verapoli.*’

ஏறாளநாடுடையமானவேபலமானவியன

‘ Mánavépala Mánavíryan of Erálanáda; *the present Zamorin.*’

வளளுவநாடுடையஇராயிரஞசாத்தன

‘ Iráyaran Cháttan of Valloova Náda; *at present Walloova Nadd.*’

நடும்புறையூர்நாடுடையகொதையிரவி.

‘ Kotai Iravi Nedoomputiyoor ; *now called Nedumbrayoor.*’

கிழபபடைநாயகம்செந்நின்றமூர்க்கஞசாத்தன்

‘ Múrkkan Cháttan, Resident of Kízh-padai-náyakam.’

வனறகைசெரிக்கணடன குனறபபொழனுய கீழவாயக கேளபபனெ
ழுதது.

‘ The hand writing of Pózhanáya. Kízhaváya Kéllappan, engraved by Vandragai-Sherry Kandan.’

Such is a distinct analysis of the Jew’s Grant of Cochin, letter for letter, word for word, sentence for sentence. It may, therefore, be translated freely, thus: “Swasti Sri! A Royal Edict. The Act of Privilege vouchsafed by Srí Bháskara Iravi Varma, when he tarried at Muyirí-Kóttah, in the 36th year of the 3d Cycle, when ruling the land, dispensing justice far and wide throughout his dominions. We have permitted Joseph Rabbán, an indisputed line of descent in five degrees of persons ; to receive from those subject to his authority, tribute with awe and submission. We allow the exercise and profits of all the crafts ; he may use

burning lights by day; long raiment, palanquins, umbrellas, drums, trumpets, tambourins, and garlands for the person and for the roads; and we permit the free property of seventy-two houses. And we relinquish all rates and customs. Moreover other and whatever taxes paid by the houses in the city to the Royal Exchequer he is exempted from; and in order to guarantee to him this exemption, and all the privileges, we have executed this deed on copper-leaves: To Joseph Rabbán himself, his male children, his female children, his nephews, and those (the descendants) of his daughters; in natural succession, so long as the earth and the moon remain. Srí! I witness this deed, &c. &c. &c."

II.—*Hebrew version of the Jewish Sasanam with translation into English; together with a notice of an ancient Malayalim Poem, called the Song or Legend of Payanúr. By the Rev. H. Gundert.*

בשלום האלוה הוא מלך שעשה כרצונו הארץ ולוה
אלוה נשאתי ידי אירוה ברמין שגוזר בפרטגמיא זה שהרבה
מאות אלף שנים נהג הממשלה שנה ושני שנים בזה היום
יושב בכנגנור וגוזר לו 36 שנים למלכותי גזרתי בעמיע ובגבורה"
הירשתי ליוסף רבן בגבורה ובעמיץ חמשה מיני צבע " ותותא "
ורכיבת פיל וסוס " וקריאת לפנות הדרך " ולגייר מן המשה
העמות " נר היום " וגם מצעות הארץ " ומצעות הקישוטים
לנוי " מגדל הפורה " צל " ודאמן " והצוצרות תוף המכה
בשני עצים " זה הכל נתתי לו ולשבעים ושנים בתים ··
ושביתת ארץ ומאזנים ושכירותם עזב " ושאר המדינות שיש
בו תושבים ובתי כנסיות יהיה הוא נשיא וראש ומושל "
בלי שום שינוי וגרעון וערעור עשה טל הנחושת ונתן
לאדון של המשה צבעים הוא יוסף רבן לו ולזרעו בנים
יבגות חתן וכלה " כל זמן שזרעו יים בעולם וכל זמן —
קיים י אלו הנזכרים קיי ים " ויברך אלוה לזו

העדים ″ צינד כובירטין מטאדין ″ בנבילה נאדוכומין

שיריכנדין ″ חידלנא דגמנא ביגריין·בלוד נאד אירברין

שטן. ″ נידטרהור כולא אירוי ″פי לאפאטו מידכין שטין ″

וארה שירי כנדין ″והסופר כילפיין ······

In the peace of God, the king, who according to his pleasure made the earth, and to this God have I lifted up my hand. I, *Erveh Barmen,* who rule as Sovereign for many 10,000 years, and have held the Government a year, and years of years, sitting this day in *Canganúr* and decreeing, in the 36th year of my kingdom (or perhaps more literally "decreeing 36 years to my kingdom") I have decreed in might and power,—I in power and might, have made *Joseph Rabbán* possessor of the five kinds of colours—and (have given him) the *Tota* (a sort of Palankin?)—and the use of elephants and horses—and the right of calling at the corners of the ways—and of converting from 5 nations—the light by day—also *spreadings* (of cloths) on the ground, and *spreadings* of lines (measuring lines or ornamental hangings?) at the tower (or scaffold?—"*lanúy*" and "*hoppóreh*" are left untranslated) the umbrella—the *Dáman* (unintelligible to the Cochin Jews) the trumpets—and the drum beaten with two sticks. All this I have given to him and to the 72 houses and the revenue of the land and balances their hire has he relinquished. As for the rest of the cities wherein there are (Jewish) colonists and Synagogues, he shall be their prince and head, and ruler without any encroachments or interference or oppression (wherefore) he made the copper-plate and gave it to the Lord of the 5 colours, even *Joseph Rabbán,* to him and to his seed, sons and daughters, sons-in-law and daughters-in-law, all the time that his seed exist in the world, and all the time that the moon stands; shall, what is here recorded, be standing, (in force). And he blessed God. These the witnesses: *Enad Cobarden Mattanden—Benbelenadu Cothan Sri Canden—Kerala nadu Mana Bigarin—Balod nad Erbaren*

Shatten—Neduparur (and ט mistakes for ב and פ) *Cota Erani—Kelapatu Múdcan Shattan*—and *Talah Sheri* (ך mistake for ל) *Candan*—and the writer *Kelappên.*

N. B. *Perimpadappu* the King of *Qogin (Cochi)* is not recorded in this (list) because he (the *Perumal*) settled him as his heir in his stead.

On the above Mr. Gundert observes: "The Hebrew translator seems neither to have understood much of the original Tamil nor to have cared about rendering it faithfully. The Hebrew itself is a bad specimen of Cochin learning. The MS. from which it was copied may be about a hundred years old, and the translation was probably made with a view of satisfying the inquiries of the Dutch Officers or the Amsterdam Jews. If it is to be published it must be rather to satisfy curiosity than to throw any additional light on the matter."

Mr. Gundert then proceeds: "I have the pleasure of adding the only confirmation from native writings, I have met with, for the conjecture which I have formed about *Anjuwannam.* As a humble admirer only of Mr. Ellis' attainments in the Peninsular languages, I may venture to say, that if he had been lucky enough to see the Syrian documents, he would not have sought for a meaning in what he would have discovered to be a proper name. I also, some years ago, tried several translations of the word, before I thought of taking it for the name of a territory [chiefly on account of the parallelisms. *Anchuwannam-udaya, Issuppu,* and *Venad-udaya,* &c.] That conjecture became strengthened by subsequent acquaintance with the native tenures and the wording of deeds. Princely privileges I saw, could never have been granted but as accessories to a *Bhumidanam,* till at last, on meeting with the Syrian documents in Nov. last, (1843), I was convinced that their analogies placed the fact of *Anjuwannam* as a name and the rendering I have adopted of the 72 *Viduperu,* beyond a doubt. Objection, it is true, may be taken to the circumstance, that no recollection of the name is to be found among a people like the Jews known to be so much more tenacious of old reminiscences than the Syrians. But the fragment of the *Payanúr* poem, which I obtained from a Native at *Taliparámbu,* who gave it as the oldest and most worthless counter-present he could make to me, proves the name of *Anjuwannam,* as one of the four immigrated merchant-tribes, to have once been known even N. of Mt. Eli. This

poem is certainly the oldest specimen of *Malayalim* composition which I have seen; the language is rich and bold, evidently of a time when the infusions from *Sanskrit* had not reduced the energy of the tongue, by cramping it with hosts of unmeaning participles. But the copy which I have, is so full of antiquated terms and so disfigured by errors of transcription, that I could not now undertake to give a correct version of the whole, valuable as such a picture of bygone times would doubtless be. Perhaps, I may on another excursion to *Payanur* and the site of the forgotten *Cachilpatnam*, fall in with another copy. That the Jews should have forgotten the name of their original settlement is the less surprising, because since the destruction of their fort near *Codungalur*, they avoid the place so carefully that they will not even eat on the western bank of the river. A *Cranganore* Brahmin told me that when he gives rice to a Jewish cooly, he invariably paddles himself to the eastern shore, there to cook and eat it: but whenever a Jew is buried, earth fetched from *Codungalur* is thrown on the corpse—all on account of an old oath. Does not this circumstance tend to prove that they consider that ground, in the terms of the grant, as their everlasting inheritance?"

The Legend of Payanur—N. L. 12° 5′ *near Cavay.*

Nilakési, a woman of good family, an inhabitant of a place called *Sivapérúr (Trichoor?)* a town famous for female beauty, could not obtain a son though married to several men. She resolves therefore to do penance by wandering about as a beggar, and comes to the famous emporium *Cachilpatnam* (near *Mount Dilli*), where the chief of the place, a merchant named *Nambu Chetti*, or *Chómbu Chetti*, enters into conversation with her, advises her to perform certain vows, and then takes her to his palace as his lawful wife. A son is born, and receives the name of *Nambúsari Aren*, and a feast of rejoicing is celebrated on the 41st day on the plain of *Payanur*. At that time *Nilakési's* brothers happened to go up the coast in a ship. They hear the music, and disembark to see the play. But as they climb up a wall of the temple, some spectators expostulate with them. They call themselves *Culavánier* (merchants) who cannot be expected

to know the customs of the place, and appeal to the chief. He comes but applies his rod to the head of one, a scuffle ensues, and the strangers are killed.

Nilakési when acquainted with the murder of her brothers, leaves the palace and her son, and again wanders forth begging. The son grows up and is instructed by his father in all the arts of trade and ship-building (given in interesting detail, full of obsolete words). The ship being at length launched and manned with *Vappúrawas* (?) *Pandias, Chonakas, Chólias,* and also with one *Yavanaka,* the merchants start fearlessly on a voyage first to *Púmpatna,* round *Mt. Eli,* then passing the *Mála* (*-Dives*) into the *Tani-punul-áru* (river) to the town *Púvenkápatna,* proceed farther on to the *Cavari,* from whence they sail into another sea to other shores, till they reach the gold mountains *(ponmala)* where they exchange all their cargo for gold, return and land their goods in *Cachilpatnam,* store them in a new magazine, and dismiss the mariners with their shares. After this, when the father and son are amusing themselves with playing chess, a female devotee is announced who is not satisfied with alms, but wants to see the young merchant. Then follows a long and mysterious conversation. She invites him urgently to be present at a night-feast of women at *Payanur.* He promises, but cannot afterwards persuade his father to give him leave, who fears a plot and danger; but the son persisting in importuning him, and at last prostrating himself, he consents.

Here follows an extract, as a specimen :

നില്പാതെവീണനമസ്കരിച്ചാൻ
നിന്നാണതമ്പ്പാപൊക്കുന്നെനെ

" I swear by thee, O father, I must go."

പൊവാൻവിലക്കിനെൻവഴിത്തിരക്കം
പൊകൊഴിപ്പാൻഞരതാശ്ശുതതിപ്പൊൾ

ചാവാളരെപ്പൊലെനീന്നകലെപ്പൊകും
ചങ്ങാതംവെണംവെറികയ്യിപ്പൊൾ
കൊവാതലച്ചെട്ടിഅഞ്ചുവണ്ണം
ക്രുട്ടംമണിഗ്രാമത്താർമക്കൾ
നമ്മളുൾനാല്നകരത്തിലും
നാലരെക്കൊൾകൂടിക്കെചൊന്നാർ

The Father: "I have opposed thee to the utmost, but now I must not prevent thy going—thou goest far away like dying men—strong guards (or companions) are now required—take the children of the *Govatala Chetti*, of *Anjuwaṇnam* and of the *Manigrama*, people who, together with ourselves, are the four (classes of) colonists in the four towns." ((ക്രുട്ടം perhaps (ക്രുത്തം or (ക്രുട്ടം?)

നാലർക്കൂടിക്കെചൊന്നാരെക്കൊണ്ടാർ
അന്നാട്ടിൽവട്ടിണസ്വാമിമക്കൾ
തൊഴർവതിനാല്വക്കിറിയും
തൊല്പിപ്പാനില്ലാഈനാട്ടിൽന്നാരും
കാലെവിടിച്ചിഴക്കിലുംഞാൻ
കച്ചില്പട്ടിൽവരെന്നിക്കണ്ണുറങ്ങെൻ

"They took of the four classes of colonists, the sons (or servants) of the town-lord in *that* country, fourteen companions, a noble household, not to be outwitted (or defeated) by any in *this* country (and, says the son) "though I should be dragged by the foot, I shall return (to-morrow) to *Cachilpatnam*, nor shall this eye sleep (to-night.)"

Upon this the father advises them to take some merchandize along with them in the ship as for a fair, and the poem,

evidently a fragment closes in the 104th Sloka, with an enumeration of wares, replete with obscure terms, free from any anachronisms.

I believe that the people of *Anjuwannam* and *Manigrámmam* here mentioned as belonging to *yonder* country, can only mean Jews and Christians, (or Manicheans) who, for commerce sake, settled also beyond the *Perumál's* territories. It would be interesting to know who the two other classes are. In the mean time, the existence of four trading communities in the old *Kérala* seems to be proved, and the നാലുചെരി of the 1st Syrian document, receives some elucidation from this incidental allusion.

III.—*Narrative of the last outbreak and final subjugation of the Southern Poligars. By the late Mr. George A. Hughes, of Tachinore in Tinnevelly.*

[Mr. Hughes, an Indo-British gentleman, well known for his commercial enterprise and successful speculations in the southern districts, was the son of Mr. Hughes, of the Madras Civil Service, formerly Paymaster of Madura. He was sent to England at an early age, and received an excellent education under the charge of his uncle, Dr. Hughes, Principal of Jesus College, Cambridge. On his return to India, after serving as a clerk under the Resident of Travancore, and in the office of Mr. S. R. Lushington, Collector of the Southern Poligar Peishcush, he was appointed by Colonel Bannerman, the Officer entrusted with the charge of quelling the Poligar insurrection of 1779, to be Malabar and Gentoo Interpreter with the force, on the pay and allowances of a Captain, which was confirmed by Government on the 26th September, 1799. He continued in the same situation under Colonel Agnew in 1801, and afterwards in 1808 he accompanied the force under General St. Leger, during the Travancore war, and received the thanks of Government for his services, on the 27th February, 1809. In the interim he had engaged in commercial pursuits and entered into partnership with Mr. Charles Wallace Young, who between 1805 and 1808, obtained a lease of a large extent of waste land for the cultivation of Coffee, Indigo, and Cotton, in Tinnevelly, at an annual rent of 2000 Rupees, to continue to the close of the Company's Charter.

On the death of Mr. Young, in the latter part of 1809, Mr. Hughes succeeded to the lease, as assignee of that gentleman; and on the expiration of the Charter, the grant was renewed in 1814, on the same terms, for the period of the next Charter. Mr. Hughes likewise purchased the Colattoor and Cudalgudi Mootahs, and continued engaged in various speculations with fluctuating success, until his death, which took place on the 26th February, 1835.]

The year 1799 is memorable in the annals of Tinnevelly, for a daring rebellion on the part of several of the Poligars against the British Government, which was then but of recent establishment. These Chieftains, impatient of the order and restraint which the efficient Government now established over them, imposed on their turbulent habits, looked forward with keen desire for some opportunity to return to that contumacious attitude, that they had almost always held towards the Nabob's Government. This opportunity was fully opened to them by the absence of the Grand Army against Seringapatam, in the year above-mentioned, and the temptation was not to be resisted. Four months before the fall of that capital, the Southern Provinces were in a most agitated and critical state, and nothing but that great event saved us from general tumult and disturbance.

At the head of the disaffected Chieftains, stood the Poligar of Panjahlumcoorchey. This person wholly unmindful of the marked lenity which the Government had shown to him for former offences, was engaged many months in exciting a spirit of revolt, and for this purpose, he moved with a large body of armed retainers, first to the southern part of Ramnad, and then to Shivagherry. Our well remembered Governor, Mr. Lushington, held then the important office of Collector of the Peishcush of the Southern Poligars, and by him the Poligar was formally and solemnly warned of the desperate and criminal course in which he was now engaged. The moment did not admit of a more decided course, and intelligence of the eventful 4th of May soon reached the south, and all was calm again immediately.

The Government having now had ample conviction of the dangerous power, the treacherous disposition, and the licentious habits of this formidable body of men, found it indispensable for the peace and welfare of the country, to enter upon a complete reform of their character and condition. After the settlement of affairs in Mysore, a considerable force was despatched to Tinnevelly to effect this important object, and the command of it confided to Major Bannerman, an officer of high reputation, and of long service in the southern provinces.

Major Bannerman surrounded the fort of Panjahlumcoorchey by a prompt movement early in September 1799. His detachment, the morning he appeared before the place, consisted of I think, eight or ten companies of two native corps that had moved the preceding night from Kytaur, under Captain O'Reilly of the 3d regiment N. I. and some details of a provincial corps (raised by Lieuteant Knowles) which had marched in one night from Palamcottah under the Major's own command, and further, a squadron of cavalry under Lieutenant Dallas, that had made a forced march from Sauttoor. It was the object of these simultaneous and quick movements, to surprise the Poligar in his fort before he might have time to retire, since some apprehensions were entertained that he and all the malcontents of the country, might repair to the much stronger position of Shivagherry, all Punjahlumcoorchey being a very open plain. Under this impression, the assault of the place was resolved on immediately, although other native details and His Majesty's 19th regiment of foot appointed to the service, had not yet come up.

The Poligar having refused all unconditional surrender, and indeed showing no signs whatever of submission, and having exceeded the time allowed him to determine, the assault commenced by Captain O'Reilly, being directed with his column to blow open the principal gate (aided by a small party of Bengal artillery brought over from Ceylon) and to enter the place at that point, and Captain C. D. Bruce was

directed with the regiment under his command, the 3d N. I., to scale the works at some accessible point to the right or left of the gate, much of the wall having at a distance a dilapidated appearance. The assailants made the most persevering efforts to gain the place, but were repulsed with severe loss, particularly at the gate, which as it had been partially blown open, more hope was entertained of success at that point. The garrison was numerous and resolute throughout, and round the gate within there was an impenetrable host of spear men, and here we had four of our officers slain. The enemy's fire was less considered, but on this, as on every subsequent affair with these Poligars, our troops had abundant proof of their formidable skill in the use of their own favorite weapon, the spear.

His Majesty's 19th Foot came up shortly after the assault, and every thing was in rapid progress for another attack, when the Poligar, despairing of further resistance, abandoned his fort and fled with a few retainers, first to Sevagungah, and then to Tondiman's country, in the hope of finding concealment there for a time. He was however seized by the prompt interference of Captain Blackburne, then Resident at Tanjore, and being brought a prisoner to Kytaur, he was there executed under the sentence of a military inquiry, a few weeks after the criminal career above related.

The detachment after the evacuation of Panjahlumcoorchey, made a circuit to the north of the district, through Naglipoora and Colarputty, and then in a few days returned to canton at Kytaur, the 3d regiment N. I. having been sent to the north-west to awe that quarter. On this tour, the Civil and Military authorities declared the confiscation of several Pollams, the possessions of the confederated rebel Leaders; and at Kytaur was more deliberately pursued all those salutary reforms, of which we enjoy the benefit at this day. The misery of Tinnevelly from the cold-blooded oppressions of the Nabob's Government, and still more from the open violence and ceaseless rapine of the Poligars, can be known only by re-

ference to the public records, where they will be found feelingly and forcibly depicted by our present Governor.* The forts, and all the strongholds of the Poligars were ordered to be dismantled. All arms were ordered to be delivered up, excepting such few only as the Collector might sanction for mere personal retinue, and they were one and all warned on the pain of the severest consequences from pursuing that licentious course, and cherishing the pernicious militant notions that had called for all these stern measures of reform.

Major Bannerman left the detachment to embark for Europe early in 1800, under high and well earned encomiums from the Government. The command devolved on Major Robert Turing; who having preferred a high situation on the General Staff, left us about February. He was succeeded by Major Colin Macaulay, who with the command of the district, held also the appointment of Resident at Travancore. The state of affairs soon admitted of the separation of the detachment, and the Governor General requiring his services for a time at the Travancore Durbar, the 3d regiment N. I, was cantoned at Shenkerninaur covil, (now under the command of Major Sheppard) a few companies of another corps were left at Kytaur, and Palamcottah was garrisoned by Lieutenant Knowle's provincial corps and some other details. The main body of the force returned to Trichinopoly and other stations, and at the close of the year, there was to all appearance the most prosperous settlement of all the objects of the Government combined with the most perfect tranquillity in the country.

Two of the brothers of the late Poligar of Panjahlumcoorchey, with some other rebel chiefs had been confined in Palamcottah. One of these brothers was but a feeble person, the other was born dumb and was an object of much superstitious attachment. The last though deprived of the faculty of speech, was yet abundantly active and mischievous. In the

* The Right Honorable S. R. Lushington was Governor of Madras, when this was written.

first week of February 1801, all the prisoners in the fort made their escape. It was very obvious that much secret intercourse must have been kept up between them and the population of the confiscated Pollams, which received the fugitives with open arms, feeling abundantly discontented no doubt, at the peaceful life now required of them. An entrenchment and breast work were run up with incredible celerity round the mound and remnant of the old fort of Panjahlumcoorchey, and all the concealed arms were quickly restored to light, it having been the considerate policy of the time, to invite the surrender of arms by the payment of a liberal price for them, rather than to adopt a more rigorous scrutiny for their seizure.

Major Macaulay moved with all possible dispatch against the fugitives, with the disposable part of the Garrison of Palamcottah, and a few horsemen drawn from the Nabob's establishment to Seevalapary, there to await the junction of Major Sheppard with the 3d regiment N. I. This small force appeared before Panjahlumcoorchey, in less than a week from the escape of the prisoners, and had there to view the formidable body securely entrenched, armed far beyond expectation, and to crown all, displaying an exulting front from the flattering course of their enterprize. It was now a very serious question, whether they should be attacked forthwith, and thus hazard in case of any check much more extensive commotions, or whether it were more advisable that the detachment should withdraw for a time, and await reinforcement from Trichinopoly. Happily the latter alternative, painful as it seemed, was agreed on in perfect concurrence by Majors Macaulay and Sheppard, and the detachment commenced its retreat in the afternoon, surrounded by thousands all the night using incessant attempts to create confusion on some point or other, and then to break in and cut off the detachment. The provincial corps was but newly raised, and the Nabob's few horsemen were not to be considered—all indeed depended on the 3d regiment N. I., whose steady and firm conduct carried the detachment

through the perils of the night. It was at times so closely pressed, that infinite vigilance was called for from every officer present. As the day dawned the assailants fell off, and the detachment reached Palamcottah only to prepare for a renewal of the contest on a more extended scale.

When the expected reinforcements were on the advance from Trichinopoly, Major Macaulay moved the detachment forward to Kytaur, and when all had joined in March, it moved again towards Panjahlumcoorchey, arriving before that place on the last day of that month. In our progress thither, an affair occurred that deserves to be noticed for the credit of all parties. A considerable body of the Poligars stood firmly on the open plain, a charge of our cavalry under Lieutenant James Grant of the Body Guard, and though the Poligars were mostly destroyed, they yet inflicted severe retaliation on our men, and Lieutenant James Grant was dangerously wounded. The battering at that point of the fort that it was proposed to attack, continued from early in the day till the afternoon, but it was soon found that two 9 pounders were of little avail for this purpose against solid earth walls, and it was naturally enough apprehended, that whatever might be the damage of the day, it would be deligently repaired during the night. Under this impression, the storm of the place was ordered before the afternoon was much advanced, and it was persevered in for a very long time. The storming party consisted of two very fine but weak companies of H. M. 74th regiment, followed by the 3d regiment N. I., and some other native details under the immediate direction of Major Sheppard. The animation and gallantry of all, was indeed most conspicuous and beyond all praise. The breach (so considered by the Artillery officer) was in fact no breach at all, and all attempts to carry the place proved utterly unavailing, so daring and determined was the Garrison, and so difficult of access the point of attack. Our loss was severe in the extreme; two Officers of H. M. 74th, one of some other corps, and one of the 3d regiment N. I. of the name, I think of Eagan were killed, with men in proportion.

On the retreat, the Garrison rushed out in considerable numbers—Major Sheppard formed his own corps into line with great celerity, and must have felt the moment a very critical one, as the enemy had seized one of our field pieces.—Captain N. M. Smyth (of what corps I do not now recollect) consulting with Major Sheppard for an instant, called out for volunteers to follow him, and a party of the 3d regiment N. I. with some others immediately charged the enemy and recovered the gun.—The courage and presence of mind displayed in this striking minor affair, served in some degree to turn the current of feeling from the appalling scene around us, and showed indeed that unless behind walls, the enemy had no great confidence in their spears against our Infantry.

This severe failure may be numbered amongst many instances in which, eminent talents and qualities of the noblest stamp, are insufficient to ensure to the possessor of them the success to which he is well entitled. Major Macaulay, it was no doubt thought by many, ought to have scoured the district with one-half of the force under his command.—In truth his means were quite inadequate to his object, the guns were quite useless as battering pieces, and a further delay in the attack was not to be thought of. The government was now awakened to the whole severity of the service, a great native force was ordered from different stations of the Carnatic, an European corps, H. M. 77th, was called round from the Malabar Coast, a corps of cavalry was put in motion, and a powerful train of artillery dispatched from Trichinopoly, the command of the service being transferred to an Officer of higher rank. This was Colonel Peter Agnew, a person of great military experience, and well known as the Adjutant General of the Army for many years.

It was the best part of two months, before this new formation of the force could assemble at the scene of action, and in the interval, little more was in the power of Macaulay, than to restrict as much as practicable the range of the enemy, for which purpose he kept his station on a small ridge, a mile or

two to the westward of the fort. Their night annoyances on our position and skirmishes with our foraging parties in the day were very frequent, and they seemed to have taken up the notion, that the muskets of our sepoys were of little security against their spears during the fall of rain. On one occasion of this kind, they sallied out and attacked in a large body our right piquet, and moved off a field piece, which was recovered only by a sudden clearing up of the weather, discovering the attack to other parties of the force near at hand. The eastern range of country was fully at their mercy and they took possession of Tutacoreen with great exultation. The attachment of some of the western Poligars was somewhat doubtful, but our situation restrained much intercourse on that side; and on the north, they were kept in excellent check by the meritorious conduct and entire devotion to our cause of the Poligar of Yettiapoor, supported by a respectable portion of a fine provincial corps belonging to Ramnad. The command of that station was held by Colonel Manuel Martinz, a gentleman who in his own day filled a large space in the public mind and general respect of this quarter. He was originally in the service of the Nabob.

The expected corps all came up by the middle of May, and Colonel Agnew assumed the command about that time. From his arrival to the 24th there was the greatest activity in making a breach, and it was so thoroughly effected by that day, that to all appearance it admitted of running up with the utmost facility. The enemy however had thrown a very wide abatis of new felled thorn trees all along the approaches on every side, and this occasioned some short interruption.—Arrived at the top of the breach, it was by no means easy to descend. Here the garrison had excavated the bastion or ground all around so deeply, as not to be easily grappled with, and it is said, had carried the excavation so cleverly under the brink of the Breach, as to be able to strike with their spears in comparative safety, those who leant forward to fire on the defenders below. These were a good deal checked, it was

imagined, by hand grenades, but I believe the place was at last carried by entrance at the flanks, which however, had been strongly palisaded, and moist earth was in constant supply to repair the damage to the walls on each side the breach. The storming column consisted of the 77th King's regiment, and the small remnant of the gallant 74th, together with several native flank companies, and to the best of my recollection the whole of the 3rd regiment N. I. The contest was supported by the enemy with all the spirit of former occasions, but all resistance was vain against our present overwhelming force, and vast numbers were destroyed at the breach and in the fort; five of our officers were killed and many men of course. The whole of the surviving Poligar body retired from the fort with the most imposing regularity, unarmed persons and the women repairing to the centre, and the armed men closely ranging on each side. The cavalry however made dreadful havoc on this body, which was soon broken and dispersed. It was alleged that not one chief of any note was lost to the cause in this Panjahlumcoorchey warfare, so careful had this class been of its own safety, and one and all found refuge for a time in Shevagungah; where they soon found new occupation quite congenial to their habits.

The attention of Colonel Agnew was now to be directed to a country of a very different description to that which had just been subdued. The Shevagungah country was remarkable in those days for jungles, or rather dense impervious primeval forests of much magnitude, often stretching a dozen miles across, and in which no progress could be made but by the aid of the Pioneers. The Chief of it was known by the appellations of "The Murdoo," and "The Sherogar," terms indicative of the lowness of his origin. He was at first the servant, then the Predawn or Chief Civil officer, and at last the usurper of the rights of the ancient Rajah of the country, whose family was now nearly extinct. He had been more than once in arms against the Nabob and as often successfully bought his pardon. On the paramount authority over the Pollams being ceded to the

British government in the year 1792, he had been treated with consideration, and I believe had nothing then to apprehend from a retrospect into the origin of his authority. He possessed the reputation of being a man of considerable sagacity, yet, this was much belied by the infatuation that now governed his counsels. It must be mostly attributed to that spirit of turbulence and suspicion that seemed innate in the Poligar character of older days. Besides his traitorous intercourse with the Tinnevelly insurgents, he had actively fomented disturbances in the Ramnad district, and had instigated some leading adherents to beset and threaten the fort of Ramnad, and his proceedings altogether called loudly for the application of that system of reform that had at length humbled the bolder spirits of Tinnevelly to prostration and quiet.

The detachment moved to Tripoovanum near Madura to disencumber itself of its heavy artillery, and these it was found expedient to move forward to Ramnad, to clear that quarter of disturbance and marauders. It was an object also with Colonel Agnew, to ascertain there under more close enquiry, whether the eastern approaches to the Murdoo's Citadel (the Pagoda of Caliarcovil situated in the centre of a very deep forest) were of a more practicable nature than the western approaches, which had so seriously baffled our forces in former invasions of the country. In the year 1789 Colonel Stewart of H. M. Service had been sent against the Murdoo, with a large detachment, to reduce him to some submission to the Nabob's government. I believe that this Colonel Stewart, was our Commander-in-Chief of a much later date of that name. In this service he sustained most opposition in his attack on the western barriers, and at a still earlier date, that is in 1772, it was also on record that Colonel Joseph Smith, the contemporary of Lawrence and of Clive, had encountered much difficulty on that side of Caliarcovil.

On our march from Tripoovanum, and as we approached Tripalchetty, the enemy appeared in great bodies, and one strong party was strongly posted behind a bank flanking our

road to a great extent. The advance consisting of the 6th regiment N. I. charged this party with much effect, and in this affair the commandant of that corps, Major Gray was killed. Other parties of our advance, on taking up the ground for the day, were suddenly assailed from quarters of which they had no clear view, and some of our officers suffered here from dreadful spear wounds. I think it was here that Lieutenant Start of the 3d regiment N. I., was wounded. The next day we were again opposed, and an attempt was made to seize a gun from the rear guard, and Captain Trotter in command of it was slightly wounded.—The detachment pursued its course to Ramnad, where it arrived sometime in June without any more opposition, although there was no doubt that large parties were hovering about in the jungles north of the Vigay river in the vicinity of our route.

At Ramnad, Col. Agnew had the benefit of much communication with Col. Martinz, who had in his earlier day seen much Poligar service. He was now in years.—The eastern approaches to Caliarcovil were described by all that had any familiar knowledge of them as of much greater extent, and of far more difficult access than the western approaches, and superadded to this serious inconvenience, almost all the Ramnad district was at this time in a destitute state, partly from the disturbances that had prevailed in it, and yet more from a famine with which it had been afflicted a year or two before. Here too we had the intelligence, that the Murdoo was placing Caliarcovil in a state that might call for battering guns, and give us a renewal of the arduous scenes of Panjahlumcoorchey. Under these circumstances, the detachment retraced its steps to Madura by the route of Comary, which place, it was considered advisable to put in a good state of defence, to keep in some check the malcontents in that quarter. Events proved the utility of this measure, for while the detachment was busily engaged in Shevagungah, and its communications very much obstructed, this post of Comary entrusted to a rising young Officer of the 3d regiment N. I.,

was hardly pressed, and it would have been considered a great acquisition by the enemy, as it was far stronger in its construction than the general run of native forts. The name of the officer I have alluded to was Greaves. He had much credit given to him for his spirited conduct on this occasion, but he did not live long to enjoy it.

Our commandant having at Madura received his final instructions for the reduction of Shevagungah, and having made all his arrangements for the peculiar warfare now before him, moved in July to the north-east for the purpose of allowing a select corps to join from Dindigul under Colonel James, which had been lately employed in that quarter in putting down the Veerapatchy Poligar and his adherents.—After this junction, the whole moved forward, consisting now of a very efficient force, (of I should think at the least 7000 strong) to the attack of Sherevail, situated to the east of us. This town had become of some note since the rise of the Murdoo's fortunes. He made it his constant residence, and it was conjectured, that he might here make some vigorous stand. The march, not more than 8 or 9 miles, occupied us all the day, though the main road was a very good one; it lay through a strip of country of the general breadth of 1200 or 1500 yards, shut in on each side by high and strong jungle, whilst the intermediate space was every where crossed or flanked by the banks of tanks, close palmira topes, or occasional patches of thin and common jungle, all that the Poligar could covet for his desultory warfare.—The enemy was abundantly armed, and he possessed a great number of the small guns of his own particular description. The firing on his part was incessant all the day through, and a distant hearer might have concluded that we were in desperate conflict, but happily it was all noise and random firing, and did no serious harm; our own field pieces rarely opened but when the Poligars were in great crowds in front and on the flanks. Whenever our parties closed in upon them, they retreated to other points. The country to the left, north of our main body, seemed that in which the enemy harboured with

most confidence. and on this side was stationed Major Sheppard with his corps as a flanking column. Our equipments and baggage were an enormous mass, and would have afforded much temptation to a more enterprizing enemy. At sunset we reached our ground, and found the large town of Sherevail in general conflagration.

Colonel Agnew entertained a sanguine belief that the opening for the force of an entire new road to Caliarcovil, would be a far more eligible operation than assaulting strong and numerous barriers that were known to be constructed with all the care and ingenuity the Poligars show in such defences, and which at that moment would certainly have cost us very dear. The work of opening this road commenced with considerable alacrity, though it indeed proved throughout a most laborious undertaking. The line that was to be opened, was estimated at not less than 5 or 6 miles from the skirts of the jungle opposite the encampment, to the Pagoda of Caliarcovil, and by far the larger part of this was accomplished when sickness spread over our camp and much yet remained to be done The enemy too had now for some time, learnt to carry on under secure cover, a very harrassing resistance to our parties, as they moved up each successive morning, exposed in the open space or avenue they had made for themselves, to pursue the work of approach to Caliarcovil. It turned out a very irksome and dispiriting warfare, as the hand that dealt the blow was rarely seen, and to return it on our part with any effect, was next to impossible. Our supplies too from the extreme closeness of the country, and the crowds of peons about, became very precarious, and at last they could be brought up only by the movement of whole corps at a time for their protection.—Colonel Agnew now seeing the necessity of abandoning this plan of operations, moved early in September to a fine open plain, running at some distance parallel to the Caliarcovil jungle on the west, which proved a most acceptable contrast to the unpleasant spot we had quitted, and here the force soon recovered its wonted health and all its accustomed animation.

This period was also marked by a proceeding that had a most beneficial influence on our affairs. The Collector of the Poligar Peshcush had with great judgment sought out the Heir to the Pollum, and under the authority of the government, this personage now received in camp an investiture of his country with great ceremony and publicity. He is the present Zemindar. He had in his childhood been adopted by the last representative of the proper family of the Pollum, but had been compelled to forego his expectations, to fly for his life and remain in deep obscurity, the Murdoo, in his early days being much too powerful a chief to allow him to entertain any hope of restoration. His adherents now however, pressed his claims with much zeal, and the government with very seasonable justice and consideration determined on their entire recognition of them, and his elevation was hailed by the population in general, with the highest satisfaction. Colonel Agnew about this time made a night movement, with the cavalry and some native details to attack Peramally, which was surprised and taken possession of, without any material occurrence. It was judiciously chosen, and it had been reported that the garrison was collecting stores for some ulterior object, and its situation also allowed of parties from it, much disturbing our communication with Trichinopoly, which led to this visit. The post itself consisted of a handsome Pagoda situated on the brow of a hill, from whence ran a wall enclosing a small village below. The garrison seeing our movements to turn their rear, escaped by close passages in that direction, leading to jungles on the opposite side of the hill. The resistance it offered was very feeble.

All preparation having been completed by the 1st October for a general assault, Colonel James was desired with his separate corps to force a small barrier opposite his position, whilst the more noted barriers that had presented so much opposition in older days, were to be attacked by Colonel Agnew himself with his superior force, and with that moved the

3rd regiment N. I. The person who was confidentially attached to the officer appointed for the service, to assist him in his business with the country, had during this critical period, watchfully fixed his attention on the state of the road that had been opened by the force from Sherevail. All his intelligence went to corroborate the account, that this point was now left entirely ungaurded, the enemy seeming to view it as far too remote from our main body to need any precaution. The distance indeed was something to be considered by ourselves, but it was certain that the enemy would be sharply employed every where, and Colonel Agnew therefore approved of the movement of a small column in that direction. It was arranged, that it should proceed in such deep secrecy over night, that even our own camp should not be apprized of its movement, since we had now many of the inhabitants about us who might play us false, and it was urged as equally desirable, that in its passage forward, it should carefully avoid every hamlet, that no alarm might be given. It met not with the smallest impediment, and from the end of the excellent road that had been abandoned a month before as altogether unavailable, paths were found which had been traversed by the enemy whilst opposing our working parties, quite open to the very walls of Caliarcovil. The surprise and panic by our sudden appearance in this most unlooked for quarter, caused an instantaneous abandonment of the place, and as rapid an escape of every soul to the contiguous jungle; Colonel Agnew was kept at a stand for a short time from the numerous obstacles thrown in the way of his attack, there was of course the usual incessant firing and much general uproar, but the first barrier being penetrated at the flank, the flight of the enemy became general through the numerous narrow paths about, and they had been apprised, it is palpable, of the fall of their strong hold which must have much enfeebled their resistance. Every point of defence from the interior one to Caliarcovil was found deserted, and on discovering the Pagoda, our commandant had the high satisfaction of perceiving our sentinels on the walls. The meeting indeed was alike

happy to every one, since here was an end to this irksome service..

Colonel Agnew now moved to the north of the Shevagungah district, and Major Sheppard was sent with his corps to overlook the southern part until matters became perfectly quiet. Most of the corps forming the Force soon moved away to other stations, and those that remained were chiefly engaged on the apprehension of the principal offenders. The Murdoo was soon seized, and he suffered his fate on the highest bastion of Tripatore. This place was then a neat compact strong post, which had been usually garrisoned by the troops of the Nabob, until the Pollums passed to the Company. At the rise of these commotions, it was occupied by a party from Colonel Martinz's Ramnad corps, from which it was seized in great triumph by the Murdoo. The two Panjaulumcoorchey rebel Chiefs now also atoned for their crimes in front of their own works, which had proved the grave of no less than 14 of our officers, and so many other gallant men.

In November, Colonel Agnew leaving a corps in Shevagungah returned to Tinnevelly, bringing with him the 3d Regiment N. I., which in March or February 1802 was stationed at Palamcottah, the 6th Regiment which was sent to Sunkerninarcovil, and a corps of Cavalry which was placed at Tachinelloor. During his absence north, other desperate though minor characters of Tinnevelly, had been put down by the activity of the Collector Mr. Lushington, and the Commandant Major Macaulay, and many of them were now banished to Prince of Wales' Island. The Carnatic had by this time passed to the Company's authority, and Tinnevelly now enjoyed a state of quiet and protection, which I am sure was utterly unknown to it in any former day of its history.—Colonel Agnew had soon the satisfaction of reporting to the Government, the happy accomplishment of the service for which he had been specially selected, and he then returned to

the Presidency, and Major Sheppard his most valued and ever zealous auxiliary, soon I believe embarked for Europe.

I may now advert to those occasions in which the 3d Regiment N. I. was employed separate from the main Force. In October 1799, it was dispatched to the western Pollums, to superintend the demolition of Forts and the surrender of Arms. In that direction, the son of the Poligar of Shevaghery had been rather prominent in mischief, but the conduct of the Father had been creditable, and in consideration of this, the offences of the former were overlooked, but Shevagherry had in old days been formidable, and it was therefore expedient to watch it. After the prudent retreat from Panjaulumcoorchey early in February 1801, a Company of the Provincial corps, and a small party of the 3d. were put into the Pagoda at Streevycoontum, to protect the five villages on that side, but whilst Major Macaulay was at Kytaur, this post was either so closely pressed or became so much alarmed, that it was considered advisable to send a corps to its relief. The crowd that assailed it having been dispersed, Major Sheppard withdrew the party and returned to Kytaur. After the fall of Panjaulumcoorchey in May 1801, the corps was immediately pushed forward to Naglipoor and Caudulgoodey, the Pollum of two of the rebel confederates, whose adherents retired to Comary, where they made a momentary stand, wounding some of our men, but soon took to flight when closely charged. The corps rejoined Head Quarters a march or two before we reached Trepavanum. At Ramnad, it was detached southerly to bring up supplies and to overawe the country, and it again rejoined a few days before the Force arrived at Madura sometime in July. During the operations at Sherevail, it was specially employed to reconnoitre some old passages to Caliarcovil, situated a little to the eastward of the encampment, of which reports had been received that raised a hope they might be accessible, but Major Sheppard ascertained that this notion was without foundation, a short time before the Force changed its position altogether from Sherevail, the corps was detached

to convey supplies from Tondiman's country, in which description of service there was always as much jungle fighting as with the main body.—Its employment in the south of Shevagungah after the capture of the Caliarcovil, has been already mentioned.

How many honored names have been presented to my mind as I have proceeded in this brief narrative—Trotter, Joyce, Knowles, Little, Pepper, Stuart, all now no more; and Colonels Vesey and Welsh only, I believe, amongst the living. It deserves to be remembered that of the many corps which participated in this service, the 3d Regiment N. I. *alone* saw it through from its commencement to its conclusion. It may also be allowed to one who was attached officially to that service throughout, to express his lively recollection of the high confidence and activity it inspired wherever it was employed. It remained but a short time in Tinnevelly, being soon called upon to take a part and sustain its well earned reputation, in the more renowned transaction of the Maratta war of 1803. Yet, it may not be irrelevant to notice that early in 1799, and under the command of Captain Davidson, it formed one of the corps of Colonel Browne's Detachment, employed in reducing Coimbatore, and in collecting supplies for the Grand Army before Seringapatam. In the preceding year, it would seem that some portion of it must have been employed under Major Bannerman in quelling disturbances in Ramnad. Major Bannerman proceeded for that purpose from Palamcottah, and he was certainly accompanied by some party under Captain Tichbourne, who at that time, I believe, belonged to the 3d Regiment N. I.

IV.—*On the Inscription near the Varaha Swami Temple, at Mamallaipuram or the Seven Pagodas, with a transcript and translation.*

The above-mentioned inscription is cut in a niche, on the face of the rock against which the modern pagoda is built. The eastern side of the building abuts on the niche, about one-fourth of which is in consequence covered by the wall, and a considerable portion of the writing is thereby hidden from view. The circumstances under which the transcript was made, will be found in the Proceedings of the Committee of the Literary Society of the 6th July, 1844, at the end of this No. Three copies of the inscription were made by three different parties, which were collated by *Tándararáya Mudaliar*, the learned Principal Sudder Ameen of *Chingleput*, who also supplied a *Telugu* paraphrase of the whole, by the aid of which the present translation has been prepared.

Swasti Sri!

In the 9th *andu* of *Koppara-kesari-varmà* [also called] *Udaiyar Sri Rájendra Devar*, who having taken the whole *Irattaippádi* seven lacks and half, having intimidated *Ahawa-Malla* in battle amid the pitfal [*cuppam*] of his army, seized upon his elephants and horses, and performed lustrations of victory, when he deigned to sit upon his throne;—the citizens of *Jananáthaptura* which is *Mámallapura* the chief city of *Amúrnad* in *Amúrkóta* in the prosperous *Chólamandalam*, (*Sózjamandalam*) and we the inhabitants of *Périlam*, do record that the eastern boundary of the land which we have granted for *Alwar* (*Azjvar*)* in the temple of *Paraméswara Mahávaráha Vishnu* in our village, inclusive of the land formerly held free of tax, as *dévadánam*, lies west of *Sickuttichéri*—its southern boundary is the

* This *Alwar* is still worshipped by the *Vaishnava* Sect under the name of *Bhuta*, in the following invocation :

తులాశ్రవిష్ఠాసంభూతం
భూతంకల్లోలమాలినః
తీరెఫుల్లోత్పలామల్లా
పుర్యామీడేగదాంశకం।

"I adore *Bhuta* who from a portion of *Vishnu's* Club, was born in a blue lotus at *Mallapur* on the sea-shore, under the sign of the Balance in the constellation of the Dolphin."

north side of *Vayaluzján kannár-nilam,* belonging to *Mahávishnu* in this village,—its western boundary is the vast (shore of the) backwater [or creek]—and its northern boundary [reaches to the] south side of the temple of *Mámallai Perumál* and to the fresh water well on the south-east of the *Kónéri*—we have granted to the *Devar* as *dêvadánam,* free of tax, all the lands within these four limits, over which the guana has run and the tortoise has crawled, inclusive of *nir nilams* and *punjey nilams,* setting apart four *tadis* of land with trees and arable fields within this tract, for the expenses of meat-offerings [*bali*] to the deity, and determining that from the produce of the remaining *nir nilams,* one *padacku** and four *nazjis*† paddy, which at the rate of two-fifths are [or yield] one *kurani*‡ of rice shall be set apart for the offerings of food to the *Devar* for the two *sandhis* or stated periods of worship at four *nazjis* of rice for a *sandhi*—and also one *kurani* of paddy for two *sandhis* at four *nazjis* for a *sandhi*—for two sorts of *karis* [or meats] for each *sandhi,* two and half *sevida*§ of ghee, one *uri* ‖ of curds, *adaickáya* consisting of two areca nuts and eight betle leaves for a *sandhi,* in all three *kuranis* and four *nazjis* of paddy for two *sandhis* should be paid, and that the people who cultivate the lands, and the people in the *Madavilágam*¶ of this *Devar* shall not be subjected to the payment of any tax—I wrote at the desire of the citizens of *Mámallapura* or *Jananáthapura* and the people of *Périlam*—signed: *Tiruvézjichiludáiyar Tondan Adavalán—Karnattán* of this village; this is my writing.

This is *Olinágan Mádaiyán azjagiya Chola* the *Amur-nattu Muvendavelan's* writing.

This is *Olinágan Chendrásekara's* signature.

This is *Olinágan Nárâyana's* signature.

This is *Kalattuzjan Sùtti Araisan's* signature.

This is *Kolandai Sirálan Setty's* signature.

This is *Indipuravan Sanganagan's* signature.

This is *Máppùdi Náráyanan Mádackali's* signature.

This is *Máppùdi Ammódi Aráva Murti's* signature.

This is *Uchangkizjavan Mugalinágan's* signature.

This is *Vandázjanséri Udaiyan Arayan Pichan's* signature.

The person who molests this charity will incur the sins of having committed capital crimes on the banks of the *Ganges* and at *Kumari.*

Swasti Sri!

In the 9th *andu* of *Kóppara-késari-varmar* (or) *Udaiyar Sri Rajendra Dévar* when, having taken *Irattaippadi* of the whole seven lacks and half having intimidated *Ahawa Malla* midst the pitfal of his troops, having

*Two marcals. † A padi or measure the eighth part of a marcal. ‡ A marcal.
§ A sevida is the 120th part of a padi or measure. ‖ Half padi or measure.
¶ The establishment or inmates of the temple.

seized upon his elephants and horses, and having performed lustrations of victory,—he deigned to sit on his mighty throne; we the inhabitants of *Tiruvezjichi*, the *Dévadánam* and *Brahmadéyam*, (village) in *Ámurnàd* of *Amurkotta* in the prosperous *Cholamandalam*, do write—that the eastern boundary of the lands which we are to grant as *dévadánam* free of rent, for the *Alwar* in the temple of *Sri Parameswara Mahávaráha Vishnu*, in *Mámallapuram* or *Jananáthapura* the chief city of this *Nad* lies west of *Kommadikundil* in the road to the tank *Vannackaneri*—the southern boundary (of it) is the north of *Pallacheruvu* or the land called *Kalattuzján paraman mugali*—the western boundary (of it) is east of the field (called) *Sàttuzjàn Chendra Sekara kirama vittan*—and the northern boundary (of it) south to the field (called) *Kazjiyan semme mettan kunavan.* We have granted for this *Dévar*, the three hundred *kuzjis* of the land (named) *Eramennu* within this boundary as *dévadánam* free of rent, together with the water to irrigate this land from the tank *Vannackanéri* and also the water channel.—We are to free the cultivators of this land from the payment of the principal (*peruvari* or ayeen) and sundry (*sïlavari* or additional) taxes—and also from forced labour, *(vetti)* and the carrying of burdens and pounding of grain for the food of persons of all descriptions. Thus having agreed, we have granted (this) as *dévadánam* free of rent.

I, *Bharadwaji Adavalàn*, a Siva Bramin of *Karpackam* in this *Nad*, wrote this at the request of the inhabitants of *Tiruvezjichi.* This is my writing.

This is the writing of *Pádáyackiram vittan.*

This is the writing of *Dévaganáta pattan* of this *kshétram.*

This : *Satandei mallen senagan.*

* * * * (effaced.)

* * * * *Oli nágan Náráyanan.*

This is my writing, * * * *

This * * * * of this *kshétram.*

* * * * * *Pattan.*

I know, this is the writing of *Arumbakizján kazji iráman, Muvendavelán* of *Amur nád* in the prosperous *Cholamandalam.*

This is the writing of *Tonda Adavalàn* the *Kanattan* of this village.

In this *ándu*, *Olinágan Madáiyan*, *Muvendavelan* of *Amur nad*, granted 90 goats, for a lamp to be kept always burning.

Kámakòdan selavan, &c.

The remainder is defaced.

Two grants to the same temple are here recorded, both made in the same year but by different parties. The opening sen-

tence of both is word for word the same, and constitutes the most important portion of the deeds; possessing a double value both as affording the means of ascertaining the exact date of the Tamil inscriptions at *Mamallaipuram,* and as a historical record confirming in a remarkable manner, a fact of some importance ascertained from totally distinct sources. In a paper on the *Chalukya* Princes of *Kalyan* in the *Dekhan* published in the IVth Vol. of the Journal of the Royal Asiatic Society, and republished in Vol. VII. p. 193 of this Journal, it is stated on the authority of an inscription at *Anigerry* in the *Dharwar* district, that *Someswara Deva Chalukya I.* surnamed *Ahawa Malla* had been invaded by "the *Chola Raja* who had ravaged the *southern* provinces of *Kuntala desa,* and destroyed the city of *Pulikara nagara,* the modern *Lakshmeswar* near *Savanore.*" The *Chalukya* inscription asserts that *Ahawa Malla* defeated and slew the invader, and there is no doubt the invasion was ultimately repelled. But enough is admitted to show, that it had been in the first instance eminently successful. The present inscription evidently refers to the same fact, and there is no doubt that *Vir Rajendra Chola* surnamed *Koppara-kesari Varma* is the *Chola* Raja above referred to. This is further confirmed by other inscriptions of this same prince, on the magnificent temple at *Gangondaram,* on the north bank of the *Cavery,* of which he appears to have been the founder. One of these, in the 5th year of his reign, runs thus "*Ko-Viraja-Kesari Varma* named *Rajendra Deva,* wielding the sceptre with valor for a companion and munificence for an ornament, freeing himself from the blackest sins, having intimidated *Ahawa Malla* of *Kudala Sangama,* having vanquished the *Vickilan* and *Singalan,** and taken their queens with their effects and carriages, and having a second time terrified *Ahawa Malla* in battle; having also recovered *Venginadu* and fulfilled the vows of his elder brothers, &c." In a subsequent grant in the same temple he

*The Singalan must refer to the King of Ceylon.

is described as "having perpetuated his fame in the *northern* country which he conquered, &c."

The kingdom of *Kalyan* had not long before been rescued from foreign enemies by the great grandfather of *Someswara Deva* I. and may not have been yet fully re-established, thereby inviting the attacks of its southern neighbours, who were then in the height of their power. The inscriptions of the father of *Someswara Deva* I. named *Jayasinha,* show that he also was at war with the *Cholas,* but their differences must have ceased with the contest recorded in the present inscription, for the youngest son of *Someswar Deva,*— *Vicramaditya* II. was the most powerful sovereign, not only of his race but of his time, and ruled over an enlarged and extensive kingdom for 52 years, in the numerous extant inscriptions of which, no mention occurs of a *Chola* war. On the other hand, the *Cholas* had attained their greatest prosperity at the period of the inscription, in the time of *Vir Rajendra Chola,* whose father *Raja Raja Narendra,* acquired possession of the whole of *Telingana,* by intermarriage with the eastern branch of the *Chalukya* family, sovereigns of *Vegidesam,* and left to his son a kingdom, extending along the coast from the mouth of the *Godavery* to *Rameswaram,* and inland probably over the greatest part of the southern provinces of this Presidency.

The next point is to identify the era of *Vir Rajendra Chola* with that of *Someswara Deva* I, surnamed *Ahawa Malla.* The latter has been ascertained with tolerable precision in the paper above referred to, and is shown from a comparison of several inscriptions, to be from about S. S. 962 to 991.* By a valuable inscription recently procured, I find that *Rajendra Chola* succeeded his father *Raja Raja Chola* in S. S. 986, and the same authority shows that he still continued reigning in S. S. 1001. It is clear therefore that he was not killed in the action with *Someswar Deva.* But besides that the metaphori-

* Journal Vol. VII. p. 196.

cal language of the inscription does not imperatively require such a rendering, it is very possible that *Rajendra Chola* may not have commanded in person, but may have intrusted the expedition to one of his generals who, as shewn by numerous inscriptions of that age, were in the habit of assuming the family name of the sovereigns under whom they served. The date of the inscription, the 9th of his reign, would therefore be S. S. 995 or A. D. 1073. The battle of *Lakshmeswar* must have occurred very shortly after his accession, for the *Gangondaram* inscription already quoted is dated in the 5th of his reign. The synchronism therefore of the three records is perfect.

The last object of inquiry is the identity of the places referred to as the scene of the war. The term *Irattaippádi* used in both the *Chola* grants, does not occur in any of the *Dekhan* inscriptions that I recollect. It may however have been the familiar term for *Kuntala desa* in the south. Instances of such diversity of nomenclature are not uncommon. In the *Dekhan*, at this day the *Tamil* country and people are invariably called *Konga-des* and *Kongas*. At *Malacca* and by the *Malays* generally, the people of southern India pass under the name of *Klings*, from the ancient *Kalinga*. Now we know that a powerful race, the *Ratta Kula*, originally overcome by the *Chalukyas* and held in subjection for several centuries, again obtained the ascendancy about the 9th century, and were finally subdued by *Teilapa Deva Chalukya* the great-grandfather of *Ahawa Malla* in S. S. 895 or A. D. 973. Among the titles of *Ahawa Malla* himself, we find an indication of the more recent independence of the *Rattas*. In an inscription at *Nilgund* in the *Dambal* Talook of the *Dharwar* district, he is described as "possessing the lofty golden parasol and the whole territory that had belonged to the *Rattakula* chief, *Sri Vira Martanda*." A distinguished family of this *Rattacula*, likewise flourished at *Parsghur* and *Samdatty* in the *Dharwar* district under the *Chalukya* dynasty, and

a considerable town yet exists under the name of *Rattehalli* on the *Wardah,* about 30 or 40 miles south of *Lakshmewar.*

In the *Gangondaram* inscription, the *Chalukya* prince is designated as *Ahawa Malla* of the *Kudal Sangama.* This is the name of the junction of the *Tunga* with the *Bhadra* river near *Huli Honore,* where is situated the *Matham* of a celebrated Guru of the *Smartah* sect, usually called the *Kudalgi Swami.**

There is good reason to believe, therefore, that "*Irattaippadi*" was the name applied by the *Tamuilians* to the southern province, at least of the *Chalukya* empire, and even to suppose that it was used to signify the whole kingdom. This opinion is strengthened by the use of the expression "*the whole* 7½ *lakhs.*" In the same inscription that gives the history of the union of the *eastern Chalukya* and *Chola* families, it is stated that the first founder of the former race, descended from the rulers of *Ayodya,* "having conquered *Kadamba Ganga* and other earthly rulers, reigned over the *southern* country of 7½ lakhs from *Narmada* to *Setu*" and elsewhere, similar references are made to the 7½ lakhs dominion of the *Kalyan* kingdom. This evidently refers to the kingdom of *Kuntala desa* only, of which *Kalyan* was the capital; for that of *Kalinga* or *Vegidesam*† was the subsequent acquisition of a collateral branch. What the number 7½ lakhs refers to is not clear. In all the inscriptions of that era, territorial divisions are designated by a number unaccompanied by any explanation of the objects to which it refers. Thus the *Kadamba* family which became a feudatory to the *Kalyan Chalukyas,* are always described as lords of the *Banawassi* 12,000. It may refer to the number of villages or townships, to their revenue, or to the quota of troops the chief was bound to bring into the field.

The inferences bearing on the local history of the Seven Pagodas to be drawn from the preceding inscription are

*There are two *Mathams* of the *Shenkar Bharti* or *Smartah* sect in this neighbourhood —*Sringeri* and *Kudalgi,* besides another at *Sankeswar,* near *Kolapoor.*

† For a notice of *Vegidesam* or *Vengidesam,* see Journal Vol. II, p. 304.

the following. The era of the oldest Tamil inscription is clearly fixed at the latter part of the 11th century, and that previously assigned to the rock *sasanam* of *Salvan Cupam* is confirmed. For *Vira Chola Deva* surnamed *Tribhuvana Malla* is shown by the same inscription as that which gives the date of *Vir Rajendra Chola*, to have been the second son of that prince, and to have been nominated by him viceroy of *Telingana* in S. S. 1001, [A. D. 1079] which would place the execution of the rock inscription stated to have been cut in his 36th year, in the beginning of the 12th century or S. S. 1037, corresponding with A. D. 1115. Further, it is evident from the facts of the grant to *Alwar*, in the temple of *Parameswara Maha-varaha Vishnu*, and the subsequent mention of the temple of *Mamallai Perumal*, that the more modern creed of the *Vaishnava* sect had been established, and that of the *Saiva* subverted. Lastly, the place appears to have borne the name of *Jananátha puram* in addition to that of *Mámallaipuram*, which it is remarkable is invariably here written *Mámallapuram*. [மாமல்லபுரம்.]

In the Appendix to Mr. Ellis' treatise on *Merassi rights*, a copy and translation of the *Salvan Cupam* inscription will be found, which, had it been known at the time, would have rendered the publication of that given in a former part of this volume (p. 47,) unnecessary. The two documents agree pretty nearly, but Mr. Ellis seems to have had a less accurate transcript, than the one prepared for me, which was obtained from two copies made by different individuals acquainted with the ancient character, and these were carefully collated by *Tandavaraya Mudaliar*. Mr. Ellis has also inserted at the same place a version of the few initial half-lines of the *Varáha Swami* inscription, but these were evidently too imperfect to give the true sense. He however agrees in referring the local chiefs antecedent to the *Cholas* to the *Curumbar* race, though he errs in supposing [*Ahawa*] *Malla* to have been one of them.

The Seven Pagodas have received a greater degree of attention from their vicinity to Madras, than they otherwise would have obtained.* The repeated notice that has in consequence been bestowed on them, has thus brought together almost every thing of interest connected with them, and the curious visitor is thus furnished with data, from which to form his own opinion of their age, origin, and object.

*Heyne's Tracts XXI. p. 333.

மூதற்சாஸநம்.

ஸ்வஸ்தி ஸ்ரீ இரடடைபபாடி யெழரை யிலககமுங
கொணடு பொரிறறஙகணககொபபததாஹவமலலனைய
ஞசுவிததவஞனையுஙகுதிரையுஙகைககொணடுவிஜயாஹி
ஷெகஞசெயது வீரஸிஂஹாஸநததுவீறறிருநதருளிய
கொபபர கெஸரிவர்மரான உடையார ஸ்ரீராஜெநதரசெ
வாககுயாணடு ஒனபதாவது ஜயஙகொணடசோழமண
டலதது ஆமூரககொடடதது ஆமூரநாடடுநகரமாமலல
புரமான ஜநநாதபுரதது நகரததோமும-பேரிளமை
யோமுமஎழுததுஎஙகளூரா ஸ்ரீ வரமெஶ்வரமஹாவராஹ
விஷ்ணுகுஹததாழவாககுத தேவதாந இறையிலியாக
முனபுடையநிலமுடபடககொடுததநிலததுககுககீழபா
றகெலலை சிககுடடிசசேரிககுமேறகும தெனபாறகெல
லை ஊரகமுடையமஹாவிஷ்ணுககள நிலமானவயலுழான்
கணஞறறுககுவடககுமமெலபாறகெலலை கழிககுககிழ
ககும வடபாறகெலலை மாமலலைபபெருமான் கோயிலு
ககுங கோனேரிததெனகீழைததணணீரககிணறறுககும
தெறகுமஆகஇநநாறபேரெலலைககும நடுவுபடட நீரநி
லமுமபுனசெயநிலமும உளளிடடு உடுமபோடி ஆமை
தவழநதெவகைபபடட நிலமுமஇறையிழிசசி இநநிலமி
நதெவாககு தேவதாந இறையிலியாசவும இநநிலததுள

மாமபுல முளளிடட கணணாறு தடிநாலும ஸ்ரீபலிபடடி
யாகவுமநீககிநினற நீாநிலதது பபொகஙகொணடுஇததெ
வாககுஸ்நதியொனறுககுததிருவமுது அரிசிநானாழியாக
ஸ்நதியிரணடுககரிசி குறுணிககு ஐஞசிாணடாக நெலலு
பதககுநானாழியுமஸ்நதியொனறுககுககறியமுதிாணடும
நெயயமுது இருசெவிடடையுமதயிாமுதுஉரியும அடை
ககாயமுது-வெறறுஙகாயிரணடும இலையமுதுஎடடுககும
நெலலுநானாழியாக ஸ்நதியிரணடுககுநெலலு குறுணியு
ம ஆகஸ்நதியிாணடுககுநெலலுமுககுறுணிநானாழியாக-
நிமநதஞ செலவதாகவும இநநிலமுழுஙகுடிகளையும இத
தேவர்மடவிளாகத திருபபாடையும எபபொபபடட இ
றையுமகாடடபபெறுதொமாகவும இபபரிசு இசைநது
தெவதாந இறையிலியாககொடுததொம. மாமலலபுர
மான ஜநநாதபுரதது நகரததொமும பெரிளமையோ
மும இவாகளசொலல எழுதினென. இவவூர்கர்ணததான
திருவெழிசசிலுடையான தொணடன ஆடவலானென
இவையெனனெழுதது. இவையொளிநாகனமாதையான அ
ழகியசொழ ஆமூாநாடடு மூவெநத வெளானெழுதது.
இவையொளிநாகன-சநதிாசெகானெழுதது. இவையொளிநா
கன நாாாயணனெழுதது. இவைகளததுழான சூறறி அ
டைசனெழுதது. இவைகொனநதைசீராளனசெடடியெ
ழுதது. இவையிணடிபுாவனசஙகநாகனெழுதது. இவை
மாபபூதி நாாாயணன மாதககலியெழுதது. இவை மாப
பூதிஅமமொடி ஆராவமுர்தினெழுதது. இவைஉசசாஙகி
ழவன முகலிநாகனெழுதது. இவை வணடாழஞ சேரி
யுடையான் அாயனபிசசனெழுதது. [illegible] ததுககு
அழிவுசெயவான கஙகையிடைக குமரியிடைசசெயதார்
செயதபாவஙகொளவான.

இரண்டாவதுசாஸநம்.

ஸ்வஸ்திஸ்ரீ இரடடைபபாடியெழரையிலககமுஙகொ
ணடுபொரிறறங கணககொபபாததாஹவமலலனை யஞ
சுவிததவஞனையுங குதிரையுங கைககொணடு விஜயாபி
ஷேகஞ்செயது வீரஸிஂஹாஸநதது வீறறிருநதருளி
யகொபபரகேஸரிவர்மாான உடையாாஸ்ரீராஜெநத்ரதெ
வாககுயாணடு ஒனபதாவது ஜயஙகொணட சொழமண
டலதது ஆமூாககொடடதது ஆமூாநாடடு தெவதாநம
ஞுஹூதெயமதிருவெழிசசிலொம எழுதது இநநாடடுந
கரமாமலலபுரமான ஜநநாதபுரதது ஸ்ரீவாமெஸ்வா ம
ஹாவாாஹவிஷ்ணு ஹததாழவாாககுதெவதாநஇறை
யிலியாக எஙகளூரில நாஙகள கொடுககிறநிலததுககுகீழ
பாறகெலலை வணணககனெரிவழிகொமமடிககுணடிலுக
குமெறகும தெனபாறகெலலை களததுழான பரமனமு
கலிநிலமானபளளசசெறுவுககுவடககுமமெலபாறகெல
லைசாததுழான் சநதிரசெகாககிரமவிததன நிலததுககுகி
ழககுமவடபாறகெலலைகழியனசெமமெமெடடனகுண
வன நிலததுககுததெறகும இநநாறபெரொலலை உளளும
நடுவுபபடட எறமென னுஞசெறுவுகுழிமிகுதிககுறைவு
உளளடஙகமுனனூறுகுழியுமஇறையிழிசசி இநநிலமும
இநநிலததுககு வணணககனெரிவழிநீரும நிரொடுகாலு
முளபட இததேவாககுதெவதாந இறையிலியாககொடு
ததொம இனனிலமுழுஙகுடிகளை இனனிலததால வநத
பெருவரியுமசிலவரியுமவெடடிமூடடையாளுமஎசசொ
றறுக கூறறுநெலலும உளளிடடுககடிதொனறும காட
டககடவொமலலாதொமாகவும. இபபரிசுஇசைநதுதெ
வதாநஇறைஇழிசசிககொடுததொம. திருவெழிசசிலொ

Cromleck and Rings
at
PULLICONDAH.

மவாகளவேணடஎழுதினென் இநநாடடுககறபாககதது
பஸிவ ஸ்ரீராஹுணன ஹாராஹ்ஜி ஆடவலானென இவைஎன்
னெழுதது. இவைபாதாயககிரமவிததனெழுதது. இபப
டிககுசெததிரதது தேவகளுதபடடனெழுதது. இபபடி
ககுசசாததநதைமலலனசனகனென

இவனைகமாடடாஙகி

மறிவேன ஒளிநாகன நாராயணனென இவை எனனெ
ழுதது இபபடிககு செநதிரதது

படடனென இபபடிககு அருமபாககிழா
ணகாழி இராமநான் ஜயஙகொணட சொழஆமூரநாடடு
மூழிவநதவெளானெழுதது. அறிவேன இவவூர கர்ணத
தான தொணடஆடவலானெழுதது. இவவாணடெ இத
தெவாககுஇவவூர ஒளிநாகன மாதையான ஆமூரநாடடு
மூவெநதவெளானவைதத திருநுநதாவிளககு ஒனறுககு
வைததஆடுதொணணூறு. இததெவாககுஇடையா
திருவிளககுஒனறுககுவிடடஆடு காமக
கொடணசெலவனைகயுறற நாறபததைநது.

V.—*Some observations on a remarkable Cromlech near Pullicondah in the Carnatic.* By *Captain H. Congreve.*

An observant traveller, passing along the new road that connects Madras with Bangalore, cannot fail to have his attention arrested, by this singular vestige of the superstitions that belonged to an age bordering on the verge of the historic era.

Seated close to the side of the road, on a mound, a quarter of a mile from the bungalow, in a south-easterly direction

from it, stands the Cromlech consisting of a huge slab, supported by other flat stones of large dimensions, set on end on the ground rock; and having two rings of stones one environing the other, surrounding the base of the mound it stands upon. Five or six persons might sit with ease in the interior of the Cromlech. The only legend attached to it in the village is, to the effect of its having been constructed by *demons;* the natives considering that, no human beings were able to place these large monoliths in the position they tenant.

Cromlechs or Arthur's Quoits *(Coetne Arthor)* are common in England, Wales and Scotland, the most celebrated ones I recollect, being Kits-Coty house near Aylesford in Kent, which is surrounded by a ring of loose stone; that at Drew Staunton on Dartmoor; and one in Anglesey thus spoken of.

"Here were also the relics of a circle of stones, with the Cromlech in the midst; but all extremely imperfect. Two of the stones are very large; one which serves at present as part of the end of a house, is 12 feet 7 inches high, and 8 feet broad; and another 11 feet high, and 23 feet in girth. Some lesser stones still remain. This circle when complete, was one of the temples of the Druids in which their religious rites were performed."

In Brittany, the ancient *Armorica,* these edifices are called *Grotte aux Feés, Roche aux Feés,* names indicating the superstition connected with them by the vulgar; and which is similar to that entertained by the natives at Pullicondah. But by our antiquaries, the Cromlechs are regarded as ancient altars, erected by the Druids, who made sacrifices upon them, kept sacred fires burning; or whereon they were accustomed to stand when delivering an address to the people. To whichever use they were applied, it is certain, the Cromlechs with their double rings of stones, are of Celtic Scythian origin, since they are found wherever that ancient people or

their descendants settled. Mr. Pennant has inferred, that a similarity of religion originally existed in such parts where the Cromlech and kindred relics are found. The double rings of stones are thus spoken of by Sinclair.

"As far as can be gathered from the vestiges of such of "these sacred enclosures as remain least defaced, they seem "in their perfect state to have generally consisted of the cir- "cular row, or double row of stones in the central open space, "(the proper lucas or place of light) and beyond these, of a "wood surrounded by a ditch and a mound. A holy foun- "tain or rivulet appears also to have usually watered the "grove. Near to the temple frequently rose a sacred mount, "from which it is conjectured the priests were wont to ad- "dress the people." These double rings magnified into structures like Stonehenge, I conjecture to be the prototype of our church architecture.

But in what manner are we to account for the presence of a Temple belonging to the religion of the Druids, on the plains of India, the edifice having no affinity whatever with Hindooism or Islamism. Only, I imagine, by adopting Mr. Pennant's reasoning, and conceiving it to have belonged to a Celtic Scythian race, who inhabited this peninsula prior to the advent of the Hindoos; and at a time when Scythicism was diffused by the Celtic Scythians, throughout the greater part of the vast space included between the western shores of Ireland, and the east coast of China. The Celtic Scythians, were the descendants of Japhet, the name of whose son Gomer, was perpetuated in the Gomerians, Cimmerians, Cimbri or Celts; these passed westward, while another branch of the same people, and the children of Magog populated Asia alone with the descendants of Shem. Druidism or Scythicism, is a corruption of the earliest chosen ceremony, viz. the form adopted by Abel in sacrificing animals by fire on an Altar, with

no other canopy than the skies; whence we trace its existence, debased and perverted amongst the descendants of the sons of Noah.

It is worthy of remark, that one of the gods of the ancient Gauls was called *Belisama*, a name reminding us of the *Belu* of the Assyrians.

Numerous Druidical monuments (elsewhere described) have been found by me on the Neilgherries; and I think I have adduced sufficient evidence to the fact of Scythicism being the religion of the Thautawars, the inhabitants of those Hills. The Thautawars may have been the aborigines of the plains of India, driven before the Hindoos to the mountain, at their invasion of the Peninsula. The cave temples of India, I conjecture, were originally temples of Druidism or Scythicism, subsequently made to subserve the purposes of Hindooism, by the priests of that order who ornamented them with effigies of their gods.

The discovery of the Cromlech at Pullicondah, and of other Druidical monuments in our presidency, affords a new scope for the research of our antiquaries, possibly more interesting than that, which has usually occupied attention.

I venture to offer a surmise respecting the method whereby the huge stones of the Cromlech, were raised into their present position.

A mound of earth was probably first heaped together, the slab of the *ara* then pulled on rollers up its slope, the upright supporting stones were subsequently placed round the mound, their flat sides leaning against it. The earth was then scraped away from the top of the mound until the slab descending rested on the tops of the supporters, thus "locking" them in their places. This being achieved, the mound was wholly removed, leaving the Cromlech standing without any extraneous support.

There is a double ring of stones surrounding a mound near St. Thomas' Mount, but the Cromlech has disappeared.

Note.—[Similar edifices are not uncommon. We have observed two precisely resembling the above at a small village close to Ootramaloor in the Chingleput district, and others somewhat similar may be seen at the village of Segoor, near the foot of the Pass of that name leading to the Neilgherry Hills.]

VI.—*Papers connected with the Construction of a Pier at Madras.*

[The situation of Madras on a low sandy shore against which a heavy surf continually breaks from an open and unsheltered roadstead, is singularly unfitted for commercial purposes. The intercourse between the shore and the shipping always difficult, is oftentimes dangerous, and occasionally interrupted for days together. Many projects have at different times been proposed to neutralize or diminish these difficulties, but none of them have as yet been prosecuted to a successful issue. The earliest scheme on record, was that of Major Lennon, of the Madras Engineers, in 1803, for the construction of a Pier on wooden piles supporting a double rail-way, and for deepening the mouth of the Cooum River. This was followed by Captain Cotton's plan of a Breakwater in 1835, which was abandoned after having been partially carried into effect. Besides which the matter has been discussed from time to time on the proposition of occasional schemes, which have perished before they reached maturity. About the middle of 1843, the subject was revived by the exhibition of the model of an iron Pier at the Master Attendant's Office, the invention of Monr. Duval Piron, Chief Engineer of Pondicherry. Monr. Piron soon after visited the Presidency himself, and public interest was sufficiently awakened to induce the appointment of a Committee for the reception and examination of plans, at a public meeting held on the 1st November.

The Report of this body dated 16th December, 1844, was read at a subsequent public meeting assembled on the 21st December, having been previously published in the Madras *Spectator* of the 18th, (No. 101, vol. viii. p. 807,) but without the Appendix containing several valuable papers referred to in the body of the Report. The following article is composed of a selection from these. The first (Appendix U) is Major Lennon's statement of his scheme above referred to, addressed to Lord Clive. It was referred by the Government of the day for the consideration and opinion of the Military Board, and the Board of Trade. The former body in returning the plans pronounced them "impracticable," adding "that if practicable they would be destructive of the best defences of Fort St. George, by removing the difficulty of approach by an enemy from the sea; and that for this reason, did no other objection present itself, the Board would most strenuously oppose the adoption of any part of Major Lennon's plans." The latter authority likewise viewed the project unfavorably, one of their objections being, that it would deprive the poor boatmen of their means of subsistence! Major Lennon's Report was accompanied by a series of propositions for raising the required capital by the Subscription of 600 shares of 500 Pagodas each; for the election of a Committee of Su-

perintendence by the Subscribers; for the supply of the materials by contract; for a remuneration of 15 per cent. on all the expenditure to the executive Engineer; for permission to levy duties, &c. and by estimates of the cost, returns of the trade, tonnage, &c., which have been omitted.

No. 2 is the return of the Tonnage and Trade of the Port (Appces. S and T) on which the Committee based their calculations of the profits that might be expected to accrue from the undertaking—and Nos. 3 and 4 (Appces. W X) detail the reports of Sub-Committees on the Surf, Tide, Currents and Soundings at Madras. A valuable and interesting paper by Monr. Duval Piron, on the general subject of improving the communication from the shore (Appendix C) forms No. 5, and the specification of his proposed Pier (Appendix R) is printed as No. 6.]

No. 1.

To

THE RIGHT HONORABLE LORD CLIVE,

Governor in Council,

&c. &c. &c.

MY LORD,

Though the Honorable the Court of Directors did not think proper to give their sanction to the plan and proposal for erecting a solid Pier at Madras, which I had the honor to lay before this Government in 1798, from an apprehension of an accumulation of sand being likely to form, which would in the end render it useless, yet, so strongly is my mind impressed with the great disadvantages to which the trade of Madras is subject, from the natural difficulties which present themselves to a communication between ships and the shore, and from an ardent desire to promote the public convenience, I am induced to offer to your Lordship's consideration, two other modes of obviating those difficulties and facilitating the trade of this Port.

I am the more encouraged in the prosecution of this subject, from a conviction I was taught to entertain of the support of the Honorable the Court of Directors to the general design, were it not for the particular reason above mentioned; since neither of the plans which I have now the honor to lay before your Lordship, are in any respect subject to the same objections.

The difficulty and danger of passing the surf, being the chief obstacle to the safe communication with the shipping, the Plan No. 1 is intended

to provide a remedy for it. By this plan, it is proposed to erect a Pier upon piles of the breadth of 24 feet at top; elevated 10 feet above high water mark, and carried out to the distance of 450 yards from the shore, into a depth of 14 feet low water, which is considerably beyond any effect of the surf, in the most violent weather.

The upper part of this plan exhibits the Pier in its entire extent; and immediately under, is represented a section of the same throughout. At the distances of one hundred and eighty, and three hundred and twenty yards from the shore, an additional breadth is supposed to be given to this work, for the purpose of enabling boats of different sizes to approach, and at those points, for greater security, it is proposed to form islands as high as the floor, to prevent the shock of boats striking against it, as well as to strengthen the work throughout. This is also intended to be done at the Pier head, where vessels of two hundred tons may come close alongside, and land or embark their cargoes, without the necessity of boats.

The manner of constructing this work is particularly detailed in the plan, where a part of it is exhibited upon a larger scale, and the process of its execution, shewn by the order of the letters A, B, C, D, E, F, G. At the foot of the plan is seen in perspective, Pier head with a brig of two hundred tons in the act of embarking a cargo.

Upon the floor of this Pier are proposed to be laid two sets of railways, for the ease of conveying goods along it, by waggons built for the purpose, the advantages of which contrivance are well known; the turning bridges of communication between the railways, are for the purpose of permitting waggons to pass from one to the other, so as to avoid the obstruction which their meeting might otherwise occasion.

With regard to the practicability of constructing this work, though there would be some trouble in driving piles in the surf, yet it is already proved, not only to be perfectly practicable, but the effect derived from them with regard to their stability, is already established as a fact to be depended on; from the instance of those drove in the midst of the most violent surf, for experiment by the late Mr. Baker, which though unconnected and without support, withstood the force of the surf, for six successive monsoons before they were carried away; strengthened therefore, and connected as represented in the enlarged part of this plan, their stability I hope will appear to be perfectly secured.

The timber necessary for the construction of this work, is the chief difficulty to be encountered. It is true that piles of Teakwood and Poon

may be obtained in the quantity, and of the dimensions required, but the effect of the worms upon those timbers is so destructive, that in order to preserve them, it would be necessary to sheath the entire part of each pile immersed in the water, with copper, in the usual way for ship's bottoms, to prevent the ravages of those insects.

But though those timbers would be necessary for all the long piles, yet, from the report of persons sent to examine the woods in the Calastry and Tripetty countries, I learn that a sufficient supply of the finest Redwood and Ebony, may be procured for all the smaller piles, beams, &c. at a moderate price, which will be doubly advantageous in point of expense, as these timbers are not subject to be attacked by the worms, nor are destructible in water as the other woods are.

By the mode of construction detailed in the enlarged section, I hope it will appear, that the utmost strength is gained without offering too great opposition to the waves, and as the only part of the work which may be considered liable to injury, from any very violent weather, or extraordinary high surf, is the flooring; it is my intention that the planks should be framed in plat-forms, to be taken up at the approach of the monsoon, at which time only, it can be supposed to be in danger, and when, as there may not probably be any shipping in the roads, such interruption cannot be attended with any inconvenience.

In a work of this nature, subject as it is to numberless accidents, where seasons and opportunities must be watched, and where a variety of machinery must be used, it is not possible to form a precise estimate of what the amount may be, but after attentively considering the prices at which the different materials may be supplied on the spot, the capacity and hire of the different artificers to be employed, and making a reasonable allowance for casualties, I conclude, that the whole of the work may be executed in the best manner, for two hundred and twenty thousand Pagodas, as may be seen in the estimate subjoined, No. 1. a sum of very inadequate consideration, compared with the great and increasing advantages certain to arise from its completion.

Taking this for granted therefore, I shall endeavour to shew how this sum may be furnished in the easiest way, without exacting an increase of expense from the merchants or ship owners, but on the contrary, in addition to the safety and expedition of clearing ships, and the facility of intercourse, a considerable reduction will take place in the Port expenses, to which vessels of all descriptions are at present subject.

In order to set this in a clear point of view, it is necessary to state the various charges to which vessels are at present subject, in the midst of the inconveniences under which they labor. Though boat hire in Madras roads on the average of the last three years, amounted to Pagodas twenty-eight-thousand and eighty-seven, (28,087) of which, that on account of the King's ships, amounted to Pagodas two-thousand and sixty, seventeen fanams and forty cash, (2060 17 40) and that, on account of the Company's to three-thousand two-hundred and forty-four and fourteen fanams (3244 14 0) the expenses besides of watering, wooding, ballasting, tarpaulin hire, anchorage &c. being considered, I am credibly informed and from examining several bills of charges for landing and clearing out, it appears, that a vessel of small burden cannot clear out from the roads of Madras, under at least half as many Pagodas, as her tonage amounts to, a considerable part of which would be actually saved, compared with the assessment which I shall propose, as will appear from the following statement, and the advantages will operate most in favor of vessels under two-hundred tons, which now suffer the greatest inconvenience, but which could then come alongside the Pier head and do their business at once.

	Pgs.	Fs.	C.
Landing and Transporting Rice	12	6	0
Anchorage	3	0	0
Clearance	1	0	0
* Waterside cooly hire (half saved)	12	0	0
Weighing duty	4	0	0
* Tarpaulin hire	2	0	0
Watering (half saved)	3	0	0
Ballasting do.	8	22	40
*Occasional Boats	2	0	0
Demurrage for delays (half saved)	10	0	0
Total charge Pagodas	58	28	40

Now as some of those charges are not supposed to be relieved by the proposed Pier, I shall argue only upon those charges marked *, which would then be rendered unnecessary, and which in this case, amounts to Pagodas thirty-two, thirty-nine fanams and forty cash, as by the convenience of the Pier, a vessel of the above description could come along side, and directly land her cargo without the medium of boats, her charges then would probably be as follows,

Carriage for one day	Pagodas	1	21	0
Coolies for Waggons	"	2	21	0
	Pagodas.	4	0	0

I suppose in addition to this, an impost of twenty Pagodas per 100 tons burthen was levied for all such vessels as come alongside the Pier, discharge their cargo, and water without boats, this vessel being supposed seventy tons, shall pay Pagodas fourteen.

Suppose also, a duty of one per cent was levied on the amount of the cargo, in addition to, and in the same manner valued at the present established duties, in this instance, seventeen garce at sixty Pagodas per garce, one-thousand bags shall further pay Pagodas ten, making a total of Pagodas twenty-eight, whereby it appears there would be an actual saving of eight Pagodas, being nearly fifteen per cent on her port expenses.

But as large vessels could not come along side the Pier, but must either make use of their own boats or of lighters, which might be equally expensive, I propose lowering the rate of wharfage in their favor one half, or to ten Pagodas per hundred tons burthen, which I should hope, would secure to them the same proportional saving; while the duty of one per cent upon all merchandize, indiscriminately, whether landed or shipped, will be considered as very moderate compensation for the great advantages derived from the saving of time, the ease of doing business and the security of merchandize in general; and is not, I am credibly informed, more than equal to the peculation alone committed in Masula boats, which would by this Pier, be prevented, as the opportunity for committing it would no longer exist.

It has been argued against this scheme, that as the "adoption of this Pier, would *do away the establishment of Masula boats*; suppose an enemy should destroy the Pier, or render the destruction of it advisable to prevent his landing, in that case, where there are no Masula boats, how is the communication with a fleet requiring supply, to be kept up."

In reply to this objection I shall only ask, is it a just mode of argument to state in opposition to certain advantages, which cannot well be denied the extreme possibility of an occurrence, from whence there might eventually arise a remote chance of inconvenience, and does it follow, even admitting this possibility, that the present difficulty and danger of communication should be continued, because an enemy might at some future period interrupt an easier mode, if adopted.

Neither is it just to suppose that, even should an enemy or ourselves, from apprehension of an enemy, destroy this Pier, that we are then left without means of communicating with our own shipping, and affording them supplies.

By my plan, though the present construction of boats may be rendered unnecessary at Madras; yet it does not follow that the whole establishment of boatmen is to be done away, or those people driven to seek other means of support, boats and boatmen must at any rate be necessary, though as the construction is supposed to be materially improved, the number may be diminished, at the same time that the accomodation may be considerably increased, neither is it possible, by any destruction of this Pier, which an enemy could effect, to prevent such boats from landing and passing to the lee of, safe into shore at all times, as even were it to be burned to the water edge, it would still afford sufficient shelter to enable any boat whatever to land in perfect safety from any effect of the surf, within a certain distance of it on one side, but even supposing the worst, the whole may be remedied by keeping some Masula boats ready at the approach of a war, or collecting them from other places along the coast, where they must still be necessary.

His excellency Admiral Panier, having suggested to me that the great swell which is constantly experienced at Madras roads, might prevent vessels laying along side the Pier head, I consider it a much better ground of objection, and have therefore dotted on the plan at the termination of the Pier head, the direction in which an addition to it may easily be made, if hereafter found necessary, which would effectually remedy the inconvenience arising from the swell.

The expense of this work, in case the Honorable Company should not think proper to authorize the execution of it from their own resources, I propose, shall be defrayed from a fund raised in shares by public subscription, and to be repaid by certain imposts as above hinted at, granted to the subscribers, by authority of the Honorable Company for a limited period, as shall be more particularly explained at the conclusion, when I shall detail the estimate and means for carrying the work into execution. This mode of raising the sum necessary, I have little doubt, will be cheerfully entered into by the public, in consideration of the great benefits which it will be productive of, and in proportion as it contributes to the facility of trade, must tend to increase the duties derived from it, in which point of view, it is well worthy the particular encouragement and support of Government.

Reflecting, however, that to overcome the difficulties of the present mode of conveyance of merchandize to and from ships, is not the only circumstance necessary to render this port convenient, and conceiving that by improving the natural advantages which the situation of the Pier

affords to a certain degree, not only the ease of communication may be attained, but many other important benefits derived; I have formed the other design, which at the same time that it embraces more extensive accomodation, without being attended with much greater expence, will tend to remedy some other inconveniences.

The late monsoon afforded a strong instance of the inconvenience arising from the coming down of the rivers, on account of the want of a proper embouchure to discharge the great accumulation of water occasioned by the land floods; I have therefore formed the second design, which I conceive may not only afford a sufficient remedy for it, but render unnecessary the labour now ineffectually bestowed in opening the Bar, and also introduce a more extensive water communication through the various parts of the town.

The comparative scale at the foot of the plan No. 2, exhibits on either side of a vertical line, the different heights to which the waters of the sea and those of the river occasionally rise, which furnishes the chief data upon which the plan is founded. There is, however, this difference between them, that whereas one, that of the sea, is actuated daily; the other, that of the river, seldom rises more than once a year, and that but for a few days together.

But notwithstanding this variation in the different levels of waters occasionally communicating with each other, from the extraordinary peculiarity of this communication being cut off by the effect of the surf and southerly winds united, which in a short time choak up the Bar again; the labour of opening it is constantly with every season to be repeated, and no advantages gained from the different elevations to which these waters alternately rise.

It is evident that were it possible to remedy this extraordinary effect, and try every means to keep an open and clear communication between the river and the sea, it would most probably afford an easy passage for boats into the river, whereby all the dangers and delays of the surf might be entirely removed.

As the action of the surf in the south-west monsoon seems to be the principal agent in throwing up the Bar across the mouth of the river, so, in order to overcome this tendency and preserve a passage open, the first step necessary seems to be, to cut off the power of the surf by erecting a barrier sufficiently solid to resist its effects, and then by taking

advantage of the alternations in the different rises and falls of the tides and land-floods, to preserve this channel so guarded against the surf free from any deposition, by suffering at pleasure a torrent to pass through, and this always leaves a backwater at command, which if properly managed, will afford I imagine an adequate remedy for the evil.

It was first my idea that in order to form a perfect communication for boatr and small crafts at all times into the river, it would be necessary to construct a double set of gates in both directions, so as to establish a pond to be used against both tides and land floods, but upon closer observation it appeared to me to be unnecessary, as no material inconvenience can ever arise from boats being obliged to wait the hours of the tides to pass in or out, and during the continuance of the land-floods, there are generally so few vessels at Madras, that the communication may be easily dispensed with for so short a time, particularly when it is taken into the account, that a considerable increase of the expence must attend that addition to the plan.

In forming this design, I have endeavoured to unite what is practicable, without extraordinary trouble and expence, with what is desirable. The difficulty and danger of the present communication are generally admitted. To render a passage safe and easy for vessels of large size and great draught of water, though perhaps possible, would, I apprehend, be attended with such a great expence, as probably to amount to a prohibition. There must be an artificial management of a backwater, to keep any confined channel towards the sea, clear of the deposition of sand which would be a natural consequence of such enclosure. In order, then, to accomplish such backwater. sluices are indispensably necessary, and these when carried beyond a certain scale and extent, would not only require a vast increase of expence in the execution, but be attended with considerable difficulty in the management, besides being much more liable to accident.

Guided by these reflections, I therefore conceived that it would fulfil every moderate expectation, to effect a safe and easy passage for long boats of Men of War, and Indiamen, at the lowest tides; and when the tide was in, even for the common Donies and small craft that bring rice and other grain along the coast. The plan No. 3 intended to produce this beneficial consequence, consists of a series of sluices, each of twenty feet wide, and the floors sunk to six feet below low water at spring tides, with double gates so as to command a backwater in both directions.

These sluices, after making the necessary excavation to enter, are proposed to be guarded from the surf, and south-west winds, by two embankments formed in the most solid manner of piles of earth and stones, as expressed in the plan, and to be carried out to the distance of four hundred and fifty yards, each, from the shore, to the depth of fourteen feet low water, and at their extremity towards the sea, open to the extent of two hundred yards, as under.

In the general plan No. 3 is exhibited the relative situation and extent of the sluice and embankments, and from an inspection of these two plans, the operation of both, and the nature of their construction will be readily understood.

By these means, I conceive a safe and easy passage may be obtained for all vessels within twenty feet beam, and not drawing more than six feet water at the lowest tides, though when the tide is in, those of even nine feet draught of water within the above dimensions of beam, may freely be admitted, and the actual advantage of a harbour may be procured to all vessels of under fourteen feet draught of water within the two embankments, where there is sufficient space secured for the entire number that may be supposed at Madras at one time, to anchor in perfect safety, and even to come ashore from them along the embankments, without expence and delay of boats.

The effect of the sluices affording a water way of one hundred feet wide with a fall of, in ordinary tides, three feet perpendicular height, when all the gates are opened at the same time, may be easily conceived, and the constant daily repetition of this process, will, I imagine be readily allowed, to be sufficiently powerful to carry off any deposition of sand that may be formed.

With regard to the practicability of executing this work, it will be seen at once, that in constructing the set of sluices, the work is nearly the same as that of building the counter scarp wall of the sea face of the Fort, and the instance already quoted of the late Mr. Baker's piles, is sufficient to increase the possibility and effect of that part of the business; the rest of the work then requires no particular ingenuity, being nothing more, than carrying stones and earth to the spot, and throwing them in.

Concerning the effect of the backwater, should it be doubted that it would be sufficient for the purpose intended, it would be easy to introduce the use of ballast lighters to their aid, the work of two of which, at an

expense of thirty-six pagodas each (after the first cost) per month, will excavate from the bottom in the course of the year,* fifty-thousand one-hundred and seventy-six cubic yards, by a very moderate calculation, which is equal to the excavation required to deepen the channel from the sluices outwards nearly three times repeated in the year, as this excavation, to attain all the purposes of entering the river does not appear from careful soundings, to exceed† eighteen-thousand yards. The use of these Ballást lighters must at all events be necessary to deepen the channel in the first instance, and the continuance of them would be attended with very trifling expense, if thought necessary, which I by no means think they will be, as I conceive the operation of the backwater to be fully sufficient for the purpose. But I thought it best to anticipate objections on the subject of deposition, by mentioning an additional mode of remedying its effects.

The advantage of overcoming the danger and difficulty of the surf, and of being able to enter the river in any kind of boats with perfect safety, and which I hope will be admitted; a well founded expectation, is not the only one that will naturally result from this plan.

From observing the soundings in the river, taken before the monsoon, it is evident, that to render it navigable for such boats, as may now be supposed to enter it, will requre little expense, I therefore propose to deepen it towards the bridge next the Governor's gardens, and from thence continue a communication for boats by a cut as marked 0 in plan No. 3 into the ditch of the Black town near the south-west angle, adjoining to which, a basin may be made for the reception of boats, from thence it may still be continued without any material trouble along the south side of the Black town by the glacis of the Fort, and by enlarging and deepening the drain across the esplanade, the navigation may be continued to Popham's broad-way, where another basin may be formed. This same drain may, by the purchase of only two concerns of no great value, be still further carried on in the same direction as far as the low swampy ground now under paddy fields, called Attapollam, about four-hundred yards west of the present Custom house; here I could establish a third basin for the reception of boats, and the delivery of merchandize.

	Dr.		C.		C. ft.		C. ft.		times		in one hour				Days				C. yds.
*	2	×	25	×	7856	=	7856	×	72	=	565-488	×	8	×	300	÷	27	=	50179

	B.		L.		D.		C. ft.				C. yds.
†	160	×	450	×	4	=	488000	÷	271	=	8000

Though the accomplishment of a water communication thus far, may be thought to afford sufficient convenience to the trade in general, and might serve as a limit to this part of this plan, yet in order to extend the great benefit of an easy navigable conveyance in the most general manner, that the very favorable situation of the Black town in point of level affords an opportunity of doing; I shall proceed to mention still further advantages to be derived from it.

From the junction with the ditch of the Black town at the south-west angle; if the ditch were rendered navigable for boats throughout its whole extent, and even along the north face, it would add essentially to the strength of the place, and in this point of view alone, it is particularly worthy of the attention of Government, exclusive of the great convenience it would afford of depositing goods at any of the gates desired, with scarce any expense of carriage. Indeed, the present very insecure state of the Black town, demands some precaution, as there is nothing whatever to prevent a body of Maharatta horse from riding directly up to the foot of the walls, along the north face, and mounting the ramparts from which they could with ease plunder the Black town, nay they could gallop into it round the north-east angle without obstruction, that part being perfectly open; in order, therefore to remedy this defenceless state of the Black town, I propose to form a deep ditch completely round the whole of it, as expressed in the plan, and to communicate with the sea by means of a sluice formed precisely in the same manner as those proposed at the mouth of the river, from which the ditch may be supplied with water. From this ditch before the north face, a cut may with great ease be introduced through the curtain marked ▷◁ in Plan No. 3, and led on to join the Basin in Attapollam, thus might a most complete circulation of the tide be carried through the heart of the Black town, equally contributing to the convenience of trade, the security of the place, and the health of the inhabitants; for by keeping the water in those different basins under command, which may easily be done by gates of a simple construction; the whole force of the tide might be directed to carry off the filth, which now renders the Black town so offensive.

The difference of level throughout the whole of this line being only seven feet seven inches, there can be no inconvenience whatever arising from the execution of this plan. The highest point of this line is at the entrance of Popham's broad-way, where the surface of the ground is seven feet seven inches higher than low water at spring tides.

Having heard it said, that that part of the Black town called Attapollam before mentioned, now a mere swamp, is lower than the sea, I have been at particular pains to ascertain the fact, and am enabled to say that, it is not so low by 4 feet 2 inches, taking the mean height of the sea, which makes it higher than high water mark by 2 feet 8 inches.

By passing so close to the termination of the Clive canal, there is a convenient opportunity of forming a junction with that work, which in every point of view would be extremely eligible, and were a smaller work to the one here proposed, executed at the bar of the river of Ennore, a perfect command of the accumulated waters of both rivers might be accomplished, which might be alternately directed to clearing both Bars and would afford an excellent harbour to many small vessels at all times of the year.

The introduction of merchandize through the river to a point so distant from the present Custom house, would render it impossible to transact the business of that office there longer; it therefore becomes a necessary consequence of this plan, that a new one should be erected in another situation.

Though at first, it appeared to me that the situation immediately above the intended new bridge, near the Governor's garden would be the best for building a new Custom house, and establishing the Europe shops there as the most central, yet as I understand it is considered more eligible that the whole of the trade should be confined to the Black town, I have accordingly relinquished that idea. But in the prosecution of the foregoing design, two situations offer themselves to notice, in either of which, a new Custom house might be placed to great advantage, either within the curtain adjoining the Hospital gate, in the side of the sepoy barracks marked C in plan No. 3, or else, if thought preferable in Popham's broad-way.

Should the former situation be deemed, as I conceive it to be more generally convenient; it would be necessary to form a basin in the ditch, south of the passage way across it, and open another gate opposite to this basin, to be solely reserved for the introduction of merchandize directly into the Custom house within it, while the present gate might remain as it now is for the use of public passengers.

Or should the preference of situation for a new Custom house be given to Popham's broad-way, the site of the little bazar between it and the

esplanade would be extremely convenient for that purpose, and there is ample space behind it for the erection of store houses &c.; but whichever situation might be preferred for this purpose, as the building of a new Custom house, would be only necessary in consequence of this plan for opening the river being adopted, the expence thereof is proposed to be provided in the same manner as that of the work itself, and to be a part of the entire plan.

It has been objected to this plan, that the removal of the Custom house would be highly injurious to those private interests, which have been established in its vicinity, principally upon the presumption of no innovation being introduced, which should remove the immediate seat of the trade so far from its present situation, and therefore as there would be a degree of injustice in such a measure, occasioning considerable losses to individuals, whose speculations were founded upon these expectations; should such improvements be adopted, and the removal of the Custom house take place in consequence, that then the owners of those speculations would have a just claim to indemnity from the Company, for giving their sanction to a plan which should have such an effect.

How far these arguments may weigh, or how far the speculations of individuals, on the consideration of private interests, should operate contrary to the adoption of a great public work of general utility and convenience, it is for your Lordship's wisdom to determine: but however loath I should be to propose any scheme, that should in its consequences prove in the smallest degree prejudicial to any person whatever, it is only proper, lest these considerations should be pressed too far, that I should place all the circumstances fairly in view, in which I imagine, the inconveniences that may be complained against by some, will not appear to be so great as to counteract a plan, which is likely to be attended with the happiest consequences to the trade of Madras.

The present situation of the Custom house must be acknowledged to be very remote from the principal merchants, and by no means particularly convenient even to the Black merchants, and in respect to the effect which the expence of cooly hire from so great a distance must have upon all the articles of consumption, must in some degree be felt by every person in the settlement. The more centrally therefore that all articles of merchandize can be deposited in the first instance, the more generally advantageous it would prove both to the merchant and the consumer.

But by the plan which I have the honor to submit to your Lordship's

consideration, the whole of the trade of Madras, after experiencing the ease and safety of entering this *Port* (which it may by these means become) can be transported to the gates of the Fort, into the heart of the Black town, or along the ditch to any of the gates. Thus would a most general convenience be afforded to all ranks throughout the whole town, which would have a sensible effect in lowering the rates of carriage, and therefore reduce the prices of every article imported.

Instead of a boat, which in no instance of the present construction exceeds two tons, one capable of carrying ten or even twenty tons, may be employed at nearly the same expence, and the goods deposited in the situation desired, with scarce any charge for cooly, comparatively with what it is at present. For if we calculate the cost of landing, suppose 26 pipes of Madeira by masula boats, it will amount to 75 fanams, whereas the same articles, might then be imported to either of the points I have mentioned in the Black town, for about twenty-four fanams, which I shall set down as the probable hire of such a boat, as may then be employed, whereby a saving occurs of more than two thirds, this saving would appear much greater, if calculated on the entire cargo which such boats might carry, but only ten tons are taken as a medium, though the same boats might carry at least twenty tons.

But should the advantage of this saving which would operate so generally, be counterbalanced by the carriage to the buildings near the present Custom house, there is nothing proposed by this plan to prevent the owners from continuing to make use of the present mode of landing or shipping goods, if it should be their interest to do so.

From hence, it appears to me clear, that no absolute disadvantage can arise to the owners of those buildings, erected near the present Custom house, if it even should be removed, while the general benefits resulting from the plan, would tend in a considerable degree to increase the trade of Madras, and thereby the Customs of the Port. The only light in which their interests could be said to suffer is, when placed in comparison with the great advantages, derived by others not burthened with such incumbrances, and who are either free to choose their situations, or who happen to be already more happily situated. But this argument, at the same time that I deny the force of it, only tends to prove the great general utility of the plan itself.

Fully impressed with this conviction, and sincerely hoping that the plan and its consequences may appear in the same favorable point of view

to your Lordship, I shall proceed to a statement of the expence required for the execution of the work, and contrast it with a detail of the means for defraying the amount thereof.

The entire expence of erecting the work I propose for opening the entrance of the river, and deepening the channel both towards the Wallajah gate of the Fort, and by the intended new bridge to the south-west angle of the Black town wall, and continuing it as before described to Popham's broad-way and on to the basin in Attapollam likewise, to complete the canal round the Black town, from the Hospital gate to the north-east angle, and there to join the sea as before described, also to lead a branch through the curtain to join the before mentioned basin in Attapollam, with the consequent expences of new Custom house draw bridges &c. agreeably to plans, will not amount to more than 3,60,000 Pagodas, as will be shewn in the estimate No. 9 annexed.

From an examination of the tables annexed, which are drawn from the offices of Government, it will appear that the duties hereafter proposed, if granted by the authority of the Honorable Company to the subscribers forming a fund for defraying the expences of either of the plans proposed for a period, proportioned to the expence incurred, would yield a considerable profit to the subscribers, that is, suppose that, for the first plan of the Pier, estimated to amount to Pagodas 300,000, which with the expences of supervising &c. might possibly be increased to Pagodas 350,000, the duties proposed were granted to the subscribers for a period of not less than fifteen years.

The capital expended together with the interest for that period at ten per cent will be found to amount to Pagodas 875,000. The income proposed, as deduced from the Customs of only last year, and Master Attendant's Offices for the average of four rather unfavorable years, continued for the same period, will amount to Pagodas 1,071,150 yielding a profit of Pagodas 96,150 over and above ten per cent on the capital. Again, suppose that, to execute the second scheme, the capital laid out on the work, increased beyond the estimate in the same manner to 400,000, this, with the interest for eighteen years, will be found to amount to the sum of Pagodas 1,120,000. The income derived from the duties proposed for the same period, will be found to amount to the sum of Pagodas 145,740 to the subscribers, over and above the capital, and ten per cent interest, exclusive of the advantages of receiving it in annual payments, which if calculated according to the rules of compound interest, will be found to be considerably

greater. When therefore, so very advantageous a mode of laying out money, as either of the schemes herein proposed is at the same time productive of the incalculable benefit to the trade of this Port, which may be confidently expected from the execution of them, I cannot but entertain sanguine hopes of finding the Public, ready to stand forward in the support of whichever of the plans may meet with the sanction of Government, and the general preference of the commercial part of this settlement.

On this account therefore, I submit it to your Lordship's consideration, to propose to the Public at large, the plans which I have the honor to lay before your Lordship, that whichever of them shall be thought most conducive to the general utility may be determined on, and that to induce the Public to enter into a subscription, to raise the necessary fund for carrying the work into immediate execution, Government shall sanction to the subscribers the right of laying the following imposts; viz. upon all exports and imports without exception, a duty of one per cent, and upon all vessels that anchor in the roads, beyond the extent of the Pier or embankments, a duty of tonnage not exceeding ten Pagodas per one hundred tons burthen, and for such as either come along side the Pier, or anchor within the embankments, a tonnage of twenty Pagodas per one hundred tons, and that these duties shall be vested in the subscribers either for a limited, certain, or for an indefinite period, reserving to the Company the right of resumption of those duties to themselves, upon reimbursing the subscribers with an advance of a certain premium on their shares, optional with the Company as may be agreed upon.

The advantages likely to result to the Honorable Company by either of these schemes, are very great, but particularly from the latter, not only the trade of the Port would be very considerably increased by the great facility afforded to it, but additional value would be given to all the waste ground in the Black town, which would by this plan come into general demand, also the great security afforded to the Black town from having a ditch of 60 feet broad and 9 deep, which by aid of the sluices the water may be kept up to, would considerably improve the value of all the property there, and to this the opportunity afforded of always keeping it clean, and thereby rendering the most noisome part of the town, sweet and healthy.

Upon all these different accounts, it would afford me the greatest satisfaction if your Lordship should think proper to recommend the consideration of these plans, not only to the Public in general, but to the different

Boards of Revenue, Trade and Military, as I conceive the extent of the latter plan, embraces objects which may be deemed worthy of the particular report of each, and I am sanguine enough to hope, that their reports would prove favorable.

Though I cannot avoid giving a decided preference to the latter plan, as calculated to afford much more general, as well as more permanent advantages, yet, different circumstances may possibly counteract the adoption of it, I trust however, that your Lordship will bestow upon both, the consideration, which I conceive the subject merits, and as my chief wish in forming these plans is not only to remedy the existing disadvantages of this port, but to extend the beneficial consequences on the most general manner possible. I look with confidence to the support of your Lordship and that of the Public at large, and humbly offer the subjoined propositions to your Lordship's examination, subject to such correction or alteration as may be thought expedient.

I am &c.

FORT ST. GEORGE, 1st *March* 1803.

(Signed) W. C. LENNON, *Captain Engineers.*

No. 2.

MEMO.

Total number of Vessels, and their tonnage, arriving at the Port of Madras for the last 5 years.

	No. of			Tonnage.		
	English & other Vessels.	Country Vessels.	Total Vessels.	English & other Vessels.	Country Vessels.	Total Tonnage.
From 1st August 1839, to 31st July 1840........	188	1,429	1,617	*59,030	*98,000	1,57,030½
From 1st ,, 1840, to 31st ,, 1841........	208	1,245	1,453	*76,149	*86,000	1,62,149
From 1st ,, 1841, to 31st ,, 1842........	252	1,158	1,410	*92,268	*81.000	1,73,268
From 1st September, 1842 to 31st August 1843..	315	1,157	1,472	1,27,907½	80,978	2,08,885½
From 1st ,, 1843 to 31st ,, 1844....	294	1,122	1,416	1,23,297	76,124	1,99,421
			Total..	478,650	422,102	

Average of 5 years
English 95,730
Country 84,420

180,150

* * * The separate returns in these years not being obtainable, the tonnage of the country vessels has been computed at the usual average, and the balance left for the English and others.

FORT ST. GEORGE.

Exports.	Ports not Subordinate.			Subordinate Ports.			Total.
	Merchandize.	Treasure.	Grain.	Merchandize.	Treasure.	Grain.	
	C. Rs.	C.Rs.	C.Rs.	C.Rs.	C.Rs.	C.Rs.	C.Rs.
1840—41	63,83,719	61,32,951	95,446	7,67,347	2,30,700	79,032	1,36,89,195
1841—42	82,93,664	54,25,877	67,427	6,33,220	1,02,125	7,278	1,45,29,591
1842—43	78,71,345	38,30,789	1,38,935	6,23,104	2,11,900	5,690	1,26,81,763
	2,25,48,728	1,53,89,617	3,01,808	20,23,671	5,44,725	92,000	4,09,00,549
Imports.							
1840—41	58,92,979	15,89,164	11,01,332	25,98,828	None.	10,85,142	1,22,67,445
1841—42	54,98,057	6,27,927	7,99,734	29,95,655	None.	10,85,630	1,10,07,003
1842—43	48,60,087	5,56,388	7,41,053	29,95,396	12,870	13,13,186	1,04,78,980
	1,62,51,123	27,73,479	26,42,119	85,89,879	12,870	34,83,958	3,37,53,428

Grand Total both Import and Export of the Port of Madras . . 7,46,53,977

No. 3.—On the Currents, &c.

My Dear Captain Jenkins,

I now sit down to inform you of the few particulars regarding the run of the sea and set of the current in the Madras roads, &c. which has come under my notice, although I much fear that my observations have been too loosely made and too over scanty, to be of much service to you. In the first place with regard to,

1st. The distance from shore of the outer surf—From a careful measurement in the months of October, November, and December 1838, it appeared that on occasions,— such as it would be considered dangerous to permit a boat to go off from the beach, the surf extended to a distance of from 450 to 500 feet from the shore, but that, during a smart gale on the 6th December the surf extended to or beyond a buoy, which was 828 feet from the shore, but the confusion was such, as to render the distinction between breakers, (such as occur at sea) and the surf, very difficult. In the next place,

2d. The velocity of the current, was found to vary with the force of the wind and at its maximum, reached to 3 or 3½ miles per hour.

3d. The run of the sea during a monsoon day, such as would be considered dangerous for boats passing through the surf, was found by means of an iron buoy, (which was anchored at 828 feet from the shore) to be five feet, and during a smart gale on the 6th December it was estimated to be nearly double of this, but the want of adequate means on that emergency, prevents my speaking with more precision.

4th. No observations were made to discover the permanency of the soil, but at 828 feet from the shore, the depth of water was then found to be 18 feet, and at 300 feet from the shore, at which I drove a pile, the distance was once measured twenty feet, and afterwards somewhat more, i. e. between 20 and 20½ feet, but beyond this rough sort of measurement nothing was attempted, by reason of the pile, (which was intended for a measurement of the tides) being washed away.

5th. The tides in the Madras roads, at a maximum do not exceed 3½ feet.

6th. The pile above alluded to, was composed of two buoys of Autcha wood, held together by two iron hoops, that was sunk or rather driven to a depth of five feet by means of a hand jumper, moved by five or six

men, but beyond this depth, two hours of hard hammering failed to produce any effect—the pile by reason of bad workmanship at the scarfing was broken on the second day during a moderate swell, and the upper half washed away; on adopting a more secure mode of scarfing, and again driving it to a depth of five feet, it was left to itself for a few days, with a view to see, if the action of the swell would loosen it, and thereby render a further driving necessary, but a rather rough night put an end to these experiments by breaking the pile off at 2 or 3 feet from the ground, the scaffolding however which depended on the pile alone for support, might have been reached by the waves, in which case this second fracture is not at all to be wondered at. I should have mentioned that the pile was 34 feet long by 10 inches diameter, and armed at its lower end by a sharp well made shoe.

The above comprises the little all that I have to communicate to you, and with the wish that it was better worth sending.

True copy
(Signed) T. A. JENKINS.
21*st November* 1843.

I remain,
Yours very faithfully,
(Signed) T. G. TAYLOR.

No. 4.—On the Soundings.

To

J. OUCHTERLONY, ESQ.
Secretary to the Pier Committee.

SIR,

1. I have the honor to forward you for the information of the Pier Committee, the following detailed report of soundings, shelving of the beach to the extent of 200 feet from the bulwark, the rise and fall of the sea together with such further notice of the locality of the sea line, as seems essential to a due consideration of that important project, which the Committee have in contemplation.

2. The soundings were taken at low water, and with so much care and precision, that they may be relied upon.

100	feet from the coping stone.		Dry sand.	
150	do.	do.	$1\frac{1}{4}$ foot	loose sand.
200	do.	do.	$6\frac{1}{4}$ feet	
300	do.	do.	8 do.	
500	do.	do.	9 do.	
600	do.	do.	10 do.	
720	do.	do.	15 do.	

840	do.	do.	18 do.	hard sand.
900	do.	do.	20 do.	
1020	do.	do.	21 do.	
1080	do.	do.	23 do.	
1200	do.	do.	25 do.	

The last sounding was parallel with the Breakwater Buoy.

3. The inner soundings, indicate loose sand gradually increasing to a firm bottom of hard sand, without and beyond 900 feet, the sand is of a greyish color. In the open roadstead there are several patches of clay, in some parts mud, whilst in others sand prevails.

4. The surf broke at 350 feet from the coping stone on the 14th of October 1844, when the last survey was made, and then the weather was moderate.

5 About 500 feet from the road bulwark or barrier, and 400 feet from the inner wash of the surf, is a ledge of sand, and just outside this bank the depth increases from 10 to 15 feet, but within and without this ridge of sand, and excepting that sudden change, the soundings are very regular; this bank doubtless causes the break of the outer surf in rough weather.

6. The declivity of the beach is one foot in every nine, as determined by a levelling instrument.

7. The shifting of the sand within the bank is so irregular and uncertain, that in my opinion it cannot be defined, though at the same time it does not shift to any depth, and would not affect the stability of piles well driven in.

8. The rise and fall of the sea may be estimated at 2 feet 2 inches during the neaps, and 2 feet 10 inches at the full and change of the Moon, but during a heavy gale, from the eastward, the sea has risen, to upwards of 6 feet, and in violent hurricanes, such as that experienced on the 10th of December 1807, when I myself, was on the beach throughout its extreme violence, the sea certainly rose above the beach road-way which was wholly washed away, and I have no doubt that during that tremendous storm, the sea rose at least 10 feet.

9. I am of opinion that the surf in ordinary weather does not rise above three feet, in rough weather about six, and during a gale when the whole of the road-stead presents one continued shew of breakers, the inner tier of breakers or surf may rise as high as 12 or 14 feet.

10. The current is materially affected by the strength and direction of the wind, and at times during either monsoon, I have known it change against its usual course for a few days; and on this very day in the heart of the N. E. monsoon, the current has so much subsided, as to be scarcely perceptible in the outer roads,—the greatest velocity of the current is, in my opinion, at the rate of two and a half miles per hour, the average 1½, and it is stronger in shore than in the offing.

11. All experience tends to shew that the gales of wind and hurricanes have occurred at intervals of several years, and that there are timely warnings or indications of the approach of these severe visitations, and also that they are of short duration; for instance, in the heavy gale of October 1842, when the sea and surf raged with great violence from 8 A. M. on the 23d until 2 A. M. on the 24th yet at 6 A. M. within 24 hours from the commencement of the gale, and a few hours after its decline, the swell and surf had so completely subsided, that boats and cattamarans were enabled to ply.

12. Should any further information be necessary which it may be in my power to afford, I shall at all times be ready and most willing to give it.

I have the honor to be,

Sir,

Your most obedient Servant,

(Signed) CHRIS. BIDEN,

Master Attendant.

MASTER ATTENDANT'S OFFICE,
Madras, *5th December* 1844.

No. 5.—On the improvement of the Communication between the Shore and Shipping at Madras.

The only means that can be employed for improving the communication between the shore and the shipping at Madras is either the erection of a basin into which boats could enter at all seasons, or the erection of a pier of such a length that its head shall be quite out of the surf, even in bad weather.

The impossibility of erecting a basin, the entrance of which could be left free at all seasons being generally acknowledged, the only means that

remains of improving the communication between the shore and the shipping, is the erection of a pier.

The question being thus laid down, it is necessary to examine what are the requisites of the pier in order to conclude from that examination, which of the different structures of this description answers them best, and consequently ought to be preferred; these requisites are:

1st. That the kind of structure adopted should change nothing in the region of the sea, along the coast, and for that, it must oppose no (or, but very little) resistance to its action.

2d. That the stability should be as great as the durability, which cannot be obtained, but if the materials employed for the structure, have the required qualities for these requisites being equally ensured.

The cause to which the coast of Corromandel owes its formation, continuing in action, though much less rapid than it was in former times, new strata of sand are added to ancient ones, and form successive deposits which are not very sensible when they are equally distributed upon a great length of coast, but which would soon appear, if the sands were stopped in their progress by any obstacle; this is what would take place if the structure adopted was a *full* one such as a stone pier, the sands accumulating on one side or other, according to the currents being north or south, would by dint of time, reach its farther extremity, and, from this moment, it would no longer be of any use; this kind of structure, which is besides very expensive, not being fit for the place, there is but an open work which can be erected, without any such inconveniency. The open works are timber piers, for the construction of which nothing but timber is employed; the suspension piers, for which the piles for the pillars and the planking only are of timber, the remaining being of wrought iron and cast iron, and at last, the *fixed* pier similar to the one projected, which are wholly of wrought iron and cast iron, the planking excepted. To pronounce with exactitude, upon the merits of these different systems, we must examine the advantages and inconveniences presented by each of them. The timber piers have, upon the suspension pier, the advantage of a greater stability, but they are not so easily repaired and do not last so long, all their parts being equally liable to a rapid decay, while in the suspension piers, the piles which form the pillars and the planking only are exposed to the same causes of destruction. The sea worms are so abundant in the Indian ocean, that at Bourbon, a timber pier was entirely destroyed, in less than one year after its erection. It is true that a pro-

cess has been found out to preserve timber from the sea worms but it is very expensive, of a difficult application and its efficacy has not been as yet sufficiently tested. Besides the timber works at sea offer the inconvenience of being more exposed to the action of the sea and of the wind, on account of the necessity of giving large dimensions to the piles, braces stays &c. in order that they can resist the forces exerted upon them. The suspension piers have no advantages that the fixed piers have not, in a same degree, while they are liable to many inconveniences to which these are not exposed. At first, it is certain that, whatever may be the precautions taken, timber piles will never last so long as wrought iron ones afterwards, the points of rest of the chains of suspension, being at a great height above the level of the sea, the force which tends to make the piles of the pillars yield, exerting itself upon these single points, is much greater than if it was distributed on the whole length of the pier, and, acting on a shorter lever. The chances for the piles sinking, after having been driven, are also greater. The whole weight of the pier pressing upon the small number of piles forming the pillars, the pressure as to the section of each pile, is much more considerable than if it was equally pressing upon a greater number of piles. Besides, among the suspension Piers existing, there is none that has a sufficient breadth, for the wants of the trade at Madras, the Brighton Pier being only 12½ feet broad. This single consideration would be enough to prevent the adoption of a suspension Pier for Madras. A Pier similar to the one projected, will do much better for the place, being in the mean while less expensive, of a more easy execution and not liable to so many repairs in a same space of time. It now remains to consider if in this structure all the requisites of stability, solidity and durability, are sufficiently ensured. As to the stability, there is no doubt but it possesses it in a greater degree than a suspension Pier, to ascertain if the requisites of solidity and durability are equally ensured, it is necessary to know.—

1st. The character and capability of the sea's bottom within the required limits, for receiving and firmly retaining piles.

2d. The reality of any shifting of the sand, within a certain distance from the shore.

3d. The distance at which, in bad weather, the surf breaks from the shore, the force exerted by the surf, and its angle of incidence with the shore in the respective monsoons.

4th. The extreme height of the waves, in violent monsoons.

5th. The forces that will be exerted upon the Pier, at all seasons.

6th. The part where the projected work will be exposed to the greatest risk of injury, and the precautions to be taken against their being received.

7th. The principle of the structure proposd to be erected, the materials to be employed, their strength, stability, and thence their capability of resisting the force exerted upon the Pier, their durability and the expedients to be resorted to, to preserve the structure from a rapid decay.

The bottom of the Sea at Madras is a stratum of sand, white and grey, perfectly pure, and consequently of the best character for receiving and firmly retaining piles ; the sand may have a less or greater thickness above the stratum of clay, upon which it rests, without any inconveniency for the hold of the piles ; for if this thickness of the sand is such that the piles can be wholly driven in, the depth attained will be so much greater, while if the clay is to be met, before the piles are sufficiently driven, this inferior stratum being harder, the depth attained will be less, but on account of the greater hardness of the soil, the hold of the piles shall be as great.

Shifting sands do not exist, but at the mouth of large rivers where a violent current, in its encounter with the sea, meets with a great resistance producing eddies which moving the bottom of the sea, throw off the sands on one side and another, and thus form sandy banks that shift their position according to the direction of the currents. No such thing existing at Madras, we may conclude a priori that there are no shifting sands. The theory, in this circumstance, agrees with the facts. The divers interrogated by Capt. Biden, have declared that, beyond two fathoms, they have never observed any shifting of the sea's bottom. It is on this side only that there is a sort of shifting bank, so that differences may have been found in sounding where it exists, and attributed to shifting sands while they were owing to the shifting of the bank, according to its being at a less or greater distance from the shore. It results from the soundings taken last November, that, from the beach to a distance of 80 fathoms where the depth of water is 9 feet, the slope of the sea's bottom is nearly regular, that, at a distance of 90 fathoms, the depth is 14 feet, which gives a difference of 5 feet for a length of 10 fathoms only, while, for a length of 60 fathoms from this point, the depth of water at 150 fathoms from the shore being 23 feet, the difference is but 9 feet. Thus the bottom of the sea, within these limits is composed of two

regular slopes, between which there is a much steeper one of five feet in ten fathoms; from which we must conclude that this is the point where the surf begins to rise. These data agree with the observations of Mr. Taylor and Mr. McKennie, according to which the exterior limit of the surf in ordinary weather is fixed at 460 feet from the shore.

The distance at which the surf breaks from the shore, as has been stated in the preceeding para, is never more than 80 fathoms in ordinary weather, and according to the observations of Mr. Taylor, 133 fathoms in bad weather, thus the force exerted by the surf cannot be greater than that which is produced by waves 5 or 6 feet high, for when the height is greater and the sea is very heavy, the surf breaks beyond its farther limit, and is confounded with the breakers existing all over the roads. The angle of incidence of the surf with the shore has been found by Mr. Taylor to be 3 degrees, but though it should be 10 or 12 degrees, the obliquity of the waves would still be so small, that their shock may be considered as being perpendicular to the coast.

Mr. Taylor has observed the height of the waves at Madras with all the accuracy that this learned Astromomer brings in all his scientific observations, and never found it to be more than 10 or 11 feet, which gives 5 or 5½ feet only for the height above the level of the sea. On that subject Cotton says, with great correctness, at Madras, hurricanes never last more than a few hours, thence there is no time for the sea to rise to any great height.

According to the observations of a very able Engineer, a stone 8 feet in every dimension resting upon an even plane would resist the force exerted upon it by waves 20 feet high. The weight of a stone measuring 512 cubic feet being 896,000 lbs, the pressure of each square foot, is 1,400 lbs equal to the force exerted by the waves upon a same surface, but the height of a wave at Madras being only 10 or 11 feet, the force exerted by them will be 700 or 770 lbs for each square foot in bad weather.

The part of the projected work, exposed to the greatest risk of injury, will be near the beach, for it is upon the shore that the sea breaks most violently. Against the accidents to be feared, the precautions to be taken will be to sink the foundations of the masonry work, forming the head of the Pier ashore, to such a depth that there will be no risk of its being washed away by the sea.

The system, after which the projected structure is to be erected, is contrived so that all its parts will have to support an equal weight and to

stand an equal exertion. It consists in wrought iron piles driven at the greatest depth possible, and tied, the ones to the others by braces of the same metal, by the means of cast iron collars wedged upon the piles. Being thus bound together, one of the piles cannot yield without the others yielding at the same time. The effect of this contrivance is that no part of the Pier can yield unless the braces which bind the piles are torn off, the Pier being fixed at one end in a solid masonry work, and, at the other end, at a plat form composed of a great number of piles tied together in such a manner that it is immovable; it could but slide on the bottom of the sea, if the piles were not driven in; but, even in this case; the weight is so great that, on account of the small surface exposed to the force exerted upon the Pier, it could not be moved. The Pier having its two extremities firmly fixed and immovable there is no risk of its yielding on one side nor on the other, besides, this effect is so much the less to be feared that the direction of the force exerting itself upon the Pier, being, as has been afore stated, perpendicular to the coast, tends to crush or tear it off rather than to make it yield; therefore, we must calculate what will be the force exerted, and the resistance opposed by the piles and the braces which bind each row of the Pier to the neighbouring ones. Admitting the most unfavourable circumstances, that is to say, a maximum of force exerted upon the greatest surface possible, and a minimum of intenseness for the resistance, it will be easy to ascertain whether this resistance is sufficient or not. We supposed that the waves will rise to the height of the middle braces of the rows which are 7 feet above the level of the sea; then the force will be exerted upon it, upon the braces below, the half parts of the cross braces which bind them, and upon the piles, on a length of 11 feet.

The area of one of the braces is 3*sq. f.* 135*sq. i.* which gives for the four 15*sq. f.* 108*sq. i.*; it is for a half part of a cross brace 2*sq. f.* 69*sq. i.* and for the 4 together, 9*sq. f.* 132*sq. i.*; the area for a pile, supposing it equal to that of a square inscribed in a circle of the same diameter will be 3*sq. f.* 30*sq. i.* for a length of eleven feet, and for the 3 piles 9*sq. f.* 9*sq. i.* Thus the whole surface exposed to the shock of the waves will be 33*sq. f.* 42*sq. i.* admitting now that the force exerted is the same for the whole height of the waves, though it is not so, it will be, at the rate of 770lbs. for each square foot, 25634lbs or 229 *cwt.* for a surface of 33*sq. f.* 42*sq. i.* This force as we have already stated tends to bend and crush the braces, or tear them off. Let us suppose that the piles will offer no resistance, and calculate only that of the braces which bind them. The area of the transverse section of one of the longitudinal braces is 6*sq. i.* 120*sq. l.* which gives for the six 41*sq. i.* It is for the transverse section of the diagonal

braces 3*sq. i.* 24*sq. l.* for each and for the four 12*sq. i.* 96*sq. l.* consequently the whole area of the wrought iron braces is 53*sq. i.* 96*sq. l.* The resistance to the traction of wrought iron being 90 *cwt.* for a square inch* the whole resistance will be 4830 *cwt* and relatively to the power as 21 to 1.

But it is not only the wrought iron braces which resist the force exerted upon the rows of the Pier. The supports of the rails and the planking resist in the same manner, for the first cannot give way without the last being torn off at the same time. Now the area of support is 60*sq. i.* which gives for the four 240*sq. i.* the area of the planking being altogether 600*sq. i.* the whole area of the timber work will be 840*sq. i.* estimating the resistance to the traction of teak wood to be only 10 *cwt* for each square inch† the whole resistance will be 8400 *cwt* which added to 4830 *cwt.* resistance of the wrought iron braces will give a total of 13,230 *cwt.* The force exerted being 229 *cwt.* the proportion as to the resistance will be as 1 is to 58, but the resistance is still increased on that account that the braces which bind two rows, cannot be torn off, without the neighbouring ones are bent and crushed. Besides the structure having a certain degree of elasticity the shock exerted upon one row will extend itself to the following ones, constantly decreasing in intenseness so that the force, exerted at the point which receives the shock will be less than has been estimated; it is therefore perfectly established that the stability and solidity are much greater, than is required to stand the force exerted upon the Pier, it remains now to examine if it ensures equally the requisite of durability, on the subject, let us say, at first, that the fears entertained of a rapid corrosion of iron are generally exaggerated.

This is what we read, in the Civil Engineer and Architect's Journal vol. v. page 255, in an article upon iron ship building.

The *corrosion* of iron plates by the action of the sea water proves a groundless alarm, no case of destruction from this cause, in many years experience has yet occurred. In the same vol. page 54 in speaking of a bridge of iron wire built at Brest, it is said.

" It appears from the *proces-verbal* 1st that the continuous ligature, which covered the cables, was slightly attacked, but that, by the first scratch of the file, the oxidized portion was removed, 2d that the exterior wires of the cables showed slight traces of oxidation, but that the slightest

* 1. The maximum of resistance to the traction of wrought iron is more than double than what has been estimated in the calculations.

† 2. The maximum of resistance to the traction of teakwood, supposing it is the same as that of oak, is ten times as much as has been estimated in the above calculations.

scratch of the file caused them to disappear, 3d that the interior wires of the cables were perfectly untouched." Eight years is a short space of time, but if we consider that the effects of oxidation probably continues to decrease, we may conclude that they are not so very rapid, and that the fears entertained, upon this point, are greatly exaggerated.

In the Select Committee upon Steam Navigation, June 1834 McGregor Laird Esq. being interrogated. Can you state any thing as to the durability? The Alburkah, when I left her had been in water about three years, and I could see no symptoms of decay in her.

Was there no corrosion? 'There was not any that was visible.' It appears to me generally that, after the first scale comes off the iron, very little effect is produced by the corrosion. Whenever the iron is in contact with wood, it is sure to go, the acid of the wood destroys it. Iron vessels have worked on canals for 35 years, without repair; the two iron boats built for the Seine in 1822, as yet shew no symptoms of decay. (It must be observed, that iron vessels are built with plates a few lines in thickness.)

The suspension Pier at Trinity near Edinburgh, was built in 1821, and is still in a very good state of preservation.

The erection of this Pier, of a similar one at Brighton, the great extension given to iron ship-building, are as many proofs of the advantages there are to substitute iron for timber, for these kinds of structure, and that the builders are no longer stopped by the fears of a too rapid corrosion. M. Mallet estimates the progress of oxidation to $\frac{6}{10}$ of an inch in a century, and still his experiments have been made upon irons, for the preservation of which no means had been employed. Those that are employed now, consist in the application of minium of coaltar on the iron while it is hot, of a compound of tallow, bright varnish, arsenic, and brimstone, and at last, in the process called *zincing*.

On these the following remarks are found, in the Civil Engineer and Architect's Journal.

In speaking of the iron, Queen Steamer, it is said there is no appearance of corrosion, the red lead being fresh on the plates, and neither shells, barnacles nor any foulness was on her bottom. This desirable result is caused by the single application of a compound of tallow, bright varnish, arsenic and brimstone.

On the process called zincing.

Messrs. Porter and Co. (by their patent process on Mr. Sorel's principle of zincing iron, and thereby giving it an immoveable coating which effectually prevents oxidation, galvanize any description of wrought and cast iron work. The complete success of this process is now fully established, and in France several manufactories have been worked under the patent for 5 years. The French Government have taken license, and established manufactories at Brest, Cherbourg &c. which are under the direction of Mr. Sorel.

If it is proved, that the compound employed for the Iron Queen, is as effectual, as it is said, it is this process, which ought to be resorted to, as being economical, and of easy application. However, the projector of the Pier, ought to be left free to choose, out of the processes now employed for preserving iron from oxidation, such an one as would prove more effectual, after having observed them, where they are applied. It results from what has been here aforesaid, that the requisites of durability, are as well ensured as can be desired. In any case, the projector of the proposed Pier, cannot pretend that it will last for ever, but, that it will only last longer, than any other that could be adopted, being, at the same time, less expensive and not liable to so many repairs, in the same space of time. Although the piles, should last but thirty or forty years, and we are fully convinced they will last more, there would be no great harm if, after so many years, one of them was to be replaced, as during this space of time, the Pier will require but very little repairs; to provide for those to come, a small sum of money, may be levied every year on the returns, which consequently will be hardly affected.

The farther limit of the surf never being more than 130 fathoms from the shore, the length of the Pier ought not to be more than 308 yards, and even 278. If this length was found to be sufficient, that of the platform could be increased and carried from 84 feet, it has in the project, to 140. The height of the Pier, above the level of the sea, being 14 feet, and that of the waves, in bad weather 5 or 5½ feet only, above the same level, there is no risk of the planking being torn off, nor even for receivng any injury. However for greater security, a space of one or two inches has been left between planks, so that the action of the sea should be much less, if it was to rise to such a height, which has never been seen, and seems to be quite impossible.

We dare to expect that the explanation we have given, will enable the Committee for the improvement of the communications between the

shore and the shipping at Madras and the public at large, to decide if, in the projected work, the requisites of efficiency, stability and durability are sufficiently ensured.

the 21st of December 1843.

(Signed) P. DUVAL PIRON,

Chief Engineer at Pondicherry.

SPECIFICATION of a Wrought Iron Pile Pier to be erected at Madras.

GENERAL DESCRIPTION.

The Pier to extend at right angles to the Beach from a line beyond the reach of the surf, to the distance of nine hundred feet seawards.

The roadway to be fourteen feet above spring tide level, thirty feet in width, and supported on three parallel rows of wrought iron piles.

The Pier to be terminated by a platform, eighty-four feet in length forty-two feet in width, and raised to the same level as the rest of the Pier.

Four double cranes to be placed upon the Pier head, for loading or discharging lighters or launches; two railways to be established from these double cranes to the other end of the Pier, and the covering planks of the entire Pier to be secured on the transverse beams leaving between them a space of one inch, or one inch and a half.

Foundation.—This is to be formed of wrought iron piles five and half inches in diameter. They are to be of round Iron, spaced eighteen feet longitudinally, and fourteen feet transversely from centre to centre. These piles to be driven into the ground from nine to twelve feet and to be lengthened as the water deepens, so that each part of the Pier shall stand at a uniform height of fourteen feet above spring tide level.

Cast Iron Collars.—Along each pile and at an equal distance, cast iron collars to be fitted and keyed. These collars to be two

inches of rim, and having as many jaws as is necessary for the admission of the props and braces.

Props Horizontal.—The longitudinal braces to be of flat iron, three and half inches broad by two inches thick; this first dimension to be the same for the props, the transverse and angle braces, their thickness being one and a half inch; the diagonal braces to be of round iron, two inches in diameter.

The props and angle braces to be pinned up to the longitudinal and transverse braces by iron pins, one and a half inches in diameter. The longitudinal, transverse and diagonal braces to be secured at either end, to the jaws of the cast iron collars, disposed for their admission by keys, eight inches long two inches broad and one inch thick.

Necessary Additions.—A wrought iron railing to be secured along each side of the roadway which will be changed for posts and chains on the pier head. Top rail to be one inch and three lines in diameter, the uprights two inches, and three feet long. Diameter of chain posts three inches, size of chains half an inch, four double cranes, iron stairs, ladders and other aparatus to be placed on the platform terminating the Pier.

A cast iron water pipe leading from the reservoir to the end of the Pier the piles supporting the platform to be increased in diameter from five and half to six inches.

Wood Work.—To be of teak of the best quality. The beams which lie transversely to be ten inches by six and firmly secured on the upper longitudinal braces by iron bands nailed upon them. The supports of the rails to be seven inches by five, notched into the transverse beams and bolted together. The planking to be ten or twelve inches broad, by two inches thick.

(Signed) P. Duval Piron.

ESTIMATE OF THE PIER TO BE ERECTED AT MADRAS.

CAST IRON.

			lbs.	*lbs.*	
9 Piles 5*in.* 5*l.* in diameter and 25 feet long weighing each			2,00,6,00	1,8,05,4,00	
15 do.	27	do. do.	2,16,6,48	3,2,49,7,20	
15 do.	29	do. do.	2,32,6,96	3,4,90,4,40	
15 do.	31	do. do.	2,48,7,44	37,31,1,60	
15 do.	33	do. do.	2,64,7,92	39,71,8,80	
15 do.	35	do. do.	2,80,8,40	42,12,6,00	
15 do.	37	do. do.	2,96,8,88	44,53,3,20	
15 do.	39	do. do.	3,12,9,36	46,94,0,40	
15 do.	41	do. do.	3,28,9,84	49,34,7,60	
15 do.	43	do. do.	3,45,0,32	51,75,4,80	
28 do.	45	do. do.	3,61,0,80	101,10,2,40	
Total Weight for Piles.					498,290,40
6 Longitudinal braces 17*ft.* 3*in.* long 3*in.* 5*l.* broad and 2*in.* thick weighing each *lbs.* 407,79			*lbs.* 2,44,6,74		
6 Cross braces 13*ft.* 3*in.* long, 3*in.* 5*l.* broad and 1*in.* 5*l.* thick weighing each *lbs.* 234,92			*lbs.* 1,40,9,52		
12 Props 13*ft.* 8*in.* long, 3*in.* 5*l.* broad and 1*in.* 5*l.* thick, weighing each *lbs.* 242,31			*lbs.* 2,90,7,72		
4 Angle braces 17*ft.* 6*in.* long 3*in.* 5*l.* broad and 1*in.* 5*l.* thick weighing each *lbs.* 310,27			*lbs.* 1,24,1,08		
4 Diagonal braces 22*ft.* long and 2*in.* in diameter weighing each *lbs.* 233,42			*lbs.* 93,3,72		
32 Keys 8*in.* long, 2*in.* broad, and 1*in.* thick, weighing each *lbs.* 45			*lbs.* 14,4,00		
28 Iron pins 8*in.* long, and 1*in.* 5*l.* in diameter, weighing each *lbs.* 397			*lbs.* 11,1,16		
9 Wedges 3*in.* long 6*in.* broad and 1*in.* thick, weighing each 0,84			*lbs.* 7,56		
6 Uprights, 4*ft.* long, and 2*in.* in diameter weighing each *lbs.* 4244			*lbs.* 25,4,64		
				Carried over	498,290,40

		Brought forward	498,290,40
27 Bands 1*ft.* 6*in.* long 2*in.* broad and 1*in.* thick, weighing each *lbs.*10,12 *lbs.*	27,3,24		
2 Top rails, 18*ft.* long and 1*in.* in diameter, weighing each *lbs.*47,70 *lbs.*	7,5,40		
4 Rails 18*ft.* long, 2*in.* broad and 1*in.* 5*l.* thick, weighing each *lbs.*182,34 *lbs.*	72,9,36		
Total weight between two rows	-*lbs.*10,554,14		
For 49 Similar ones - - - - - - - - - - -			*lbs.*517,15,2,86

129 Cross braces weighing - - -	234,92	30,304,68	
86 Angle braces do. - - - - -	310,27	26,683,22	
54 Diagonal braces do. - - - -	201,59	10,885,86	
230 Keys do. - - - - -	4,50	1,035,00	
215 Iron pins do. - - - - -	3,97	853,55	
75 Wedges do. - - - - -	0,84	63,00	
30 Posts for chains do. - - - -	42,44	1,273,20	
70 Bands do. - - - - -	10,12	708,40	
160 Feet of chains do. - - - -	2,65	424,00	
300 Feet of rails do. - - - - -	10,13	3,039,00	
Total weight for the platform - - - - - - - - -			75,269,91
Total weight of Cast Iron - - - - - - - - - - -			1,090,713,17

WROUGHT IRON.

2 Collars weighing each - - - -	123,08	246,16	
1 do. do. - - - - - - - -	138,12	138,12	
2 do. do. - - - - - - - -	133,10	266,20	
1 do. do. - - - - - - - -	148,14	148,14	
2 do. do. - - - - - - - -	163,18	326,36	
1 do. do. - - - - - - - -	208,30	208,30	
Total weight for one row.		1,333,28	
For 48 Similar ones - - - -			63,997,44
4 Collars weighing each - - - -	118,06	473,24	
8 do. do. - - - - - - - -	133,10	1,064,80	
22 do. do. - - - - - - - -	148,14	3,259,08	
15 do. do. - - - - - - - -	163,18	2,447,70	
23 do. do. - - - - - - - -	178,22	4,099,06	
2 do. do. - - - - - - - -	193,26	386,52	
10 do. do. - - - - - - - -	208,30	2,083,60	
Weight for the platform. - -			13,813,40
Total weight of Wrought iron - - -			77,810,84

WOOD WORK.

	c.y.	c.f.	c.i.	c.y.	c.f.	c.in.
9 Beams 29*ft.* long, 10*in.* broad and 6*in.* thick measuring each *c.ft.*12 *c.in.*144 is - - - -	4	0	1296			
4 Supports for rails 18*ft.* long, 7*in.* broad and 5*in.* thick measuring each *c.ft.*4 *c.in.*648 - - - -	0	17	864			
18 Feet of planking 29 feet long by 2*in.* in thickness measuring - - - - - - - - - -	3	7	0			
Total between two rows.	7	25	432			
For 49 Similar one - - - - - -				388	22	432
21 Beams 85*ft.* long, 10*in.* broad and 6*in.* thick measuring each *c.ft.*1 *c.ft.*8 *c.in.*720 - - -	27	12	1269			
300 Feet of Supports for rails 7*in.* broad and 5*in.* thick measuring - - - - - - - -	2	28	1584			
85 Feet of planking by 43*ft.* 3*in.* thick measuring - - - - - - - - - - - - - -	33	22	1296			
For the platform	64	10	720	64	10	720
Total of Wood Work. *c.y.*				453	5	1152
Total of brick Masonry - - - - - -				218	0	0

ESTIMATE.

486*T.* 18*Cwt.* of Cast iron, purchase, freight and putting down included, £24 per ton - - - - - -	116,856	0	0
34*T.* 15*Cwt.* Wrought iron, purchase, freight and setting up included £20 per ton - - - - - - - -	6,950	0	0
453*c.y.* 5*c.ft.* of Wood work, purchase and squaring included at 75Rs. per cubic yard - - - - - - -	33,989	0	0
3248*sq. yds.* of Planking setting up and bolting included at 1. 8 per square yard - - - - - - - - -	4,872	0	0
218 Cubic yards of brick Masonry at 12Rs. - - - -	2,616	0	0
For the setting up of beams and supports of the rails	4,000	0	0
Fences to protect the piles at the head of the Pier	2,000	0	0
Flights of Steps, Ladders and various apparatus -	3,000	0	0
Four double Cranes, at £150 each - - - - - -	6,000	0	0
For the direction and Superintendence of the construction of the Pier - - - - - - - - - -	15,000	0	0
Sundries - - - - - - - - - - - - - - - -	4,717	0	0
Total - - - Rs.	200,000	0	0

(Signed) P. Duval Piron.

VII.—*Observations on Evaporation made at the Red-hills near Madras in* 1844, *by Lieut. Ludlow, Engineers.*

This series of observations was undertaken with the intention of ascertaining with as much exactness as possible, what the actual evaporation from the surface of a large sheet of water is, and what proportion it bears to the evaporation shewn by an evaporator exposed on the land in its neighbourhood.

The evaporator employed was a flat brass vessel exposing a surface of exactly 1 square foot, and containing when filled to within an inch of the edge 1 gallon of water. It was painted white inside and was enclosed up to the level of the edge with a double wooden case, in order to prevent the brass from becoming heated.

A gallon of water was poured into the evaporator early in the morning, and the following morning what remained unevaporated was drawn off by means of a syphon into the gallon measure. The measure was then carefully filled up from a graduated glass tube, and the quantity evaporated thus measured with great accuracy.

Two evaporators of this description were used, the registers of which when exposed together under exactly similar circumstances, had been tested and found to agree well. One was then placed in the middle of the Red-hill tank, (which has a surface of several square miles,) being supported on a post firmly fixed, and the other was exposed on the land at a distance of about ¾ths of a mile from the tank.

From a comparison of the registers of these two evaporators the following results have been obtained.

During April the evaporation on the tank to that on the land was as - - - - - - - - - - 1 : 1·3897

May - - - - - - - - - - - -	1 : 1·2744
June - - - - - - - - - - -	1 : 1·2396
July - - - - - - - - - - - -	1 : 1·1881
August - - - - - - - - - -	1 : 1·1736
Mean of the 5 months.	1 : 1·2531

The average evaporation on the tank is therefore $\frac{1}{5}$th less than that on the land, or the evaporation on the land is $\frac{1}{4}$th more than that on the tank, during the hottest months of the year.

The gradual increase however of the proportional evaporation on the tank which is so plain, is a circumstance which it is difficult to assign any certain reason for.

In order to make the observations as complete as circumstances would allow, the temperature of the water in both evaporators, the temperature of the water at the surface and bottom of the tank, as well as the temperature of a Thermometer freely exposed to the sun, were observed at frequent intervals during the day. But neither an examination of these results, nor the *general* hygrometric state of the air, *nor even the force of the wind or* state of the weather satisfactorily account for the gradual increase, which I have above alluded to.

I cannot help thinking that it must in a great measure be owing to the general diminution of the depth of water in the tank, the surface of which from the beginning of April to the 20th of August fell 6 feet 3 inches.

If this should be found upon further trial to be the case, it will render still more apparent the necessity of attending to depth in forming such reservoirs, the amount of evaporation increasing not only in proportion to the surface exposed, but inversely as the depth of water.

What an important item evaporation is in the consumption of water, is very apparent from these observations.

During these 5 months the level of the water sunk 75 inches, notwithstanding falls of rain amounting to 8 inches, so that the total fall was 83 inches, but the amount of evaporation measured during this time on the tank was 53 inches so that only $\frac{3}{8}$ths of the quantity which disappeared could have been available for the purpose of irrigation, $\frac{5}{8}$ths being carried off by evaporation.

Abstract of Observations of Evaporation during the Month of April 1844

April.	At Red Hills. Evaporation in Inches. Tank.	Land.	Proportional Evaporation on Land that on Tank. Being 1.	Rain in Inches.	Temperature of water in the Evaporator. Tank.	Land.	Difference.	Temperature of water in the Tank. Top.	Bottom	Difference.	Thermometer. In Sun.	Proportion of cloudy sky in 8ths.	Force of wind. lbs. to 1 Sq. Ft.	At Madras. Dry Thermometer.	Wet Thermometer.	Difference.
1													0.45	83.37	76.79	6.58
2													0.82	84.88	78.53	6.35
3													0.80	86.22	80.03	6.19
4													0.10	88.07	80.27	7.80
5	0·3018	0 4233	1·403		,,	,,	,,	,,	,,	,,	,,	1	0.35	86.06	80.69	5.38
6	0·3432	0·4801	1·399		,,	,,	,,	,,	,,	,,	,,	4	0.47	86.04	80.60	5.44
7	0·3636	0·5056	1·391		,,	,,	,,	,,	,,	,,	,,	2	0.65	,,	,,	,,
8	0·3158	0·4243	1·340		,,	,,	,,	,,	,,	,,	,,	2	0.38	83.56	77.06	6.50
9	0·3409	0·4622	1·356		,,	,,	,,	,,	,,	,,	,,	2	0.25	83.50	76.01	7.49
10	0·3467	0·4695	1·354		,,	,,	,,	,,	,,	,,	,,	2	0.59	85.38	80.26	5.12
11	0·3850	0.4840	1·260		,,	,,	,,	,,	,,	,,	,,	0	0.55	87.01	79.13	7.88
12	0·4424	0·5730	1·295		,,	,,	,,	,,	,,	,,	,,	2	0.90	86.93	79.15	7.75
13	0 4345	0·6167	1·419		,,	,,	,,	,,	,,	,,	,,	0	0.93	86.82	80.57	6.25
14	0·4085	0·5514	1·350		,,	,,	,,	,,	,,	,,	,,	8	0.79	,,	,,	,,
15	,,	,,	,,		,,	,,	,,	,,	,,	,,	,,	0	0.88	87.05	80.18	6.87
16	0·4274	0·6142	1·437	None.	,,	,,	,,	,,	,,	,,	,,	0	0.75	86.89	81.12	5.77
17	0·5364	0·7344	1·369		,,	,,	,,	,,	,,	,,	,,	3	0.94	86.77	79.99	6.78
18	0 4611	0·6878	1·492		,,	,,	,,	,,	,,	,,	,,	3	0.34	86.71	79.94	6.77
19	0·4041	0·5838	1·445		83·75	85.67	1.92	87. 1	,,	,,	100. 8	3	0.28	86.78	79.94	6.84
20	0·3987	0·5360	1·344		84. 0	88.17	4.17	88. 1	,,	,,	104.54	2	0.27	86.36	80.06	6.30
21	0·4532	0·6004	1·325		83. 5	87. 5	4. 0	89. 2	,,	,,	104.58	6	0.21	,,	,,	,,
22	0·4199	0·6096	1·452		83. 0	85.33	2.33	86. 4	,,	,,	106.84	2	0.36	86.55	79 90	6.65
23	0·4807	0·8342	1·753		85. 0	87. 0	2. 0	87. 0	84. 5	2. 5	111.73	2	0·87	86.23	79.40	6.83
24	0·4549	0·7130	1·567		83. 5	86.33	2.83	91. 1	86. 4	4. 7	113.76	2	0.85	86.50	79.79	6.71
25	0·4819	0·8100	1·681		86.33	87.67	1.34	90. 8	85. 7	5. 1	111.73	6	0.64	86.87	80.04	6.83
26	0·4883	0·6720	1·376		84.33	85.83	1. 5	90. 3	85. 3	5. 0	108.31	2	0.58	86.47	79.10	7.37
27	0·3218	0·4012	1·247		81. 0	83.83	2.83	85. 2	81. 8	3. 4	104.69	4	0.30	85.76	79.07	6.69
28	0·3987	0·4120	1 033		81. 5	83. 0	1. 5	85. 3	81. 8	3. 5	94.84	5	0.34	,,	,,	,,
29	0·3896	0·4873	1·251		80.88	85. 3	4.17	89. 6	83. 1	6. 5	100.54	6	0.73	87.78	80.77	7.01
30	0·4060	0·4967	1·223		88.67	92.83	4.16	97. 7	91. 5	6. 2	111.85	0	0.57	88.15	81.49	6.67
Means.	0.4082	0·5673	1.3897		83.75	86.51	2.76	89. 1	85.08	4 6	106.83	2·4	0.56	86.26	79.61	6.65

Absrtact of Observations of Evaporation during the Month of May 1844.

May.	At Red Hills. Evaporation in Inches. Tank.	Land.	Proportional Evaporation on Land that on Tank. Being 1	Rain in Inches.	Temperature of water in the Evaporator. Tank.	Land.	Difference.	Temperature of water in the Tank. Top.	Bottom.	Difference.	Thermometer in Sun.	Proportion of cloudy sky in 8ths.	At Madras. Force of wind. lbs. to 1 Sq. Ft.	Dry Thermometer.	Wet Thermometer.	Difference.
1	0·4166	0·5091	1·2220	..	80. 0	82.17	2.17	85. 4	81. 0	4. 4	107.27	1	0.64	87.96	81.72	6.24
2	0·4557	0·5859	1·2860	..	80. 0	82.17	2.17	84. 7	80. 9	3. 8	105.31	3	1.05	88.64	81.52	7·12
3	0·4328	0·5470	1·2640	..	80.83	82.17	1.34	84. 9	81. 4	3. 5	106·73	5	1.03	88.44	81.23	7.21
4	0·4349	0·5514	1·2680	..	82.33	83.67	1.34	85. 1	81. 5	3. 6	109.04	0	0.51	88.79	81.33	7.46
5	0·2454	0·3141	1·2800	..	80. 0	81. 0	1. 0	81. 3	76. 5	4. 8	93.12	1	0.12	..	..	..
6	0·5131	0·6298	1·2270	..	83. 0	84. 0	1. 0	86. 2	82. 5	3. 7	109.77	6	0.99	90.98	79.61	11.37
7	0·3996	0·5298	1.3250	..	84.33	86.33	2. 0	87. 3	83. 7	3. 6	105.73	8	1.02	88.92	77.63	11.29
8	0·2144	0·2554	1·1910	..	80.83	82.33	1. 5	85. 2	82. 6	2. 6	89.89	8	0.60	82.91	77.22	5.69
9	0·2847	0·3484	1·2240	..	80.67	82. 0	1.33	86. 5	83. 0	3. 5	106.54	7	0.92	86.70	78.56	8.11
10	0·3813	0·5214	1·3670	..	83. 0	85. 5	2. 5	91. 6	88. 7	2. 9	108.77	6	0.57	88.22	79.51	8.71
11	0·4019	0·4965	1·2350	..	81. 5	83. 5	2. 0	86. 0	83. 9	2. 1	100.65	6	0.58	87.48	79.67	7.81
12	0·4162	0·5389	1·2700	..	82.33	83.33	1. 0	85. 6	82. 9	2. 7	102.15	6	0.59	..	..	..
13	0·4495	0·5880	1·3080	..	82.83	83.83	1. 0	86. 6	83. 8	2. 8	104. 7	1	0.86	88.31	80.73	7·58
14	0·4769	0·6067	1·2730	..	83.83	84. 5	0.67	88. 4	86. 0	2. 4	112. 3	1	1.18	87.99	80.06	7.93
15	,,	,,	..	..	79.17	80.83	1.66	79. 9	78. 3	1. 6	91.27	3	0.07	82.19	77.17	5.02
16	0·3157	0·3677	1·1649	..	80.33	81.83	1. 5	85. 9	84. 0	1. 9	101.11	4	0.07	86.07	81.29	4.71
17	0·3112	0·3632	1·1670	..	81. 5	82.83	1.33	86. 6	84. 4	2. 2	102.15	2	0.27	86.25	80.74	5·51
18	0·2633	0·3212	1·2200	..	80. 5	81. 5	1. 0	84. 4	82. 6	1. 8	100.04	5	0.03	86.28	79.35	6.93
19	0·3715	0·4310	1·1600	·0784	82. 0	83.17	1.17	84. 9	82. 2	2. 7	102.23	2	0.12	..	..	..
20	0·2450	0·3598	1·4690	0·242	82. 5	84. 0	1. 5	85. 0	83. 1	1. 9	106.07	5	0.31	83 67	79.09	4.58
21	0·3195	0·4056	1·2700	..	81.67	83. 0	1.33	81. 8	79. 0	2. 8	102.77	4	0.09	86.06	80.35	5.71
22	0·3686	0·5071	1·3760	..	81.33	83.17	1.84	81. 8	78. 9	2. 9	99.77	6	0.39	86.91	80.07	6.84
23	0·4089	0·5262	1·2870	..	80.67	81.83	1.16	81. 9	78. 8	3. 1	98.96	4	0.33	88.04	80·01	8.03
24	0·4601	0·5816	1·2640	..	84. 5	86.67	2.17	88. 4	84. 6	3. 8	105.94	7	0.32	88.21	80.46	7.75
25	0·4048	0·5096	1·2590	..	80.33	82.33	2. 0	80. 6	75. 6	5. 0	93.69	7	0.65	87.16	80.48	6.68
26	0·4364	0·5778	1·3240	..	80.33	83.17	2.84	82. 2	78. 1	4. 1	96.39	6	0.69	..	..	..
27	0·3806	0·4759	1·2500	..	82. 5	83.83	1.33	83. 4	79. 4	4. 0	103.54	2	0.59	86.90	79.79	7.11
28	0·3453	0·4210	2·2190	0·6840	81.83	82.67	0.84	80. 4	76. 9	3. 5	101.85	7	0.07	87.32	80.26	7.06
29	0·3648	0·4688	1·2880	0·8350	78. 5	79. 5	1. 0	81. 0	77.75	3.25	100.92	5	0·02	85.63	79.59	6.04
30	0·2891	0·4322	1·4950	..	77.83	79.33	1. 5	79. 0	76. 0	3. 0	98.23	5	0.35	86 68	80.46	6.22
31	0·3719	0·4776	1·2840	..	76.67	78. 5	1.83	78. 2	74. 8	3. 4	97. 3	3	0. 6	86.86	81.13	5.73
Means.	0.3729	0.4749	1.2744	0.082	81.24	82.77	1.53	84.22	81.09	3.13	102.04	4.5	0.5	87.02	79.96	7.06

Abstract of Observations of Evaporation during the Month of June 1844.

	At Red Hills.												At Madras.			
	Evaporation in Inches.		Proportional Evaporation on Land that on Tank. Being 1.	Rain in Inches.	Temperature of water in the Evaporators		Difference.	Temperature of water in the Tank.		Difference.	Thermometer in Sun.	Proportion of cloudy sky in 8ths.	Force of wind. lbs. to 1 Sq. Ft.	Dry Thermometer.	Wet Thermometer.	Difference.
June.	Tank.	Laud.			Tank.	Land.		Top.	Bottom.							
1	0·3927	0·4933	1·2560		78. 0	80. 0	2. 0	80. 2	75. 8	4. 4	100.92	7	0.64	87.68	81.09	6.59
2	..	0·5142	..		77. 0	81.33	4.33	82. 8	80. 7	2. 1	101.61	2	0.63			..
3	0·6011	0·7775	1·2930	0·2360	83. 0	84.67	1.67	88. 4	84. 8	3. 6	112.08	6	1.26	91.82	78.24	13.58
4	0·5545	0·7172	1·2930		82.33	84. 0	1.67	86. 1	83. 4	2. 7	109.61	1	0.56	90.99	76·53	14.46
5	0·5475	0·7288	1·3310		82.33	33. 0	0.67	85. 3	82. 8	2. 5	108.92	1	0.72	91.17	77.87	13.30
6	0·4176	0·5570	1·3340		80.16	81.33	1.17	81. 6	78. 6	3. 0	101.46	3	0.62	88.50	79.35	9.15
7	0·4018	0·5233	1·3020		78.66	80. 0	1.14	80. 2	77. 0	3. 2	104. 8	4	0.26	88 53	79.47	9.06
8	0·3594	0·4875	1·3560		78.66	81.66	3. 0	82. 4	79. 2	3. 2	107.15	1	0.08	88.61	79.57	9.04
9	0·3823	0·4917	1·2860		80. 0	83.33	3.33	83. 4	79. 6	3. 8	106.31	2	0.07			
10	0·4060	0·5092	1·2540		80.67	83.33	2.66	84. 0	80. 0	4. 0	107. 7	1	0·11	88.78	81.09	7.69
11	0·4727	0·5820	1·2340		83.17	84.33	1.16	85. 6	81. 8	3. 8	100.77	6	0.18	90.86	79.86	11.00
12	0.4073	0·4988	1·2250		80.33	82.67	2.34	82. 6	78. 4	4. 2	105.15	2	0.36	90.95	80.56	10.39
13	0·4209	0·4883	1·1600		78. 0	81. 0	3. 0	81. 0	76. 4	4. 6	99.23	1	0.17	90.76	81.47	9.29
14	0·3532	0·4360	1·2350		75.67	78.67	3. 0	78. 4	74. 0	4. 4	95.77	3	0.87	88.87	80.33	8.54
15	0·2895	0·3524	1·2170		75.67	77. 0	1.33	73. 4	69. 0	4. 4	93.19	2	0 34	86.49	80.99	5.50
16	0·1922	0·2504	1·3030	1·6350	..	..	..	..	..	..	..	8	0.05			
17	0·1747	0·1914	1·0960	2· 548	73. 0	75.66	2.66	70. 8	67. 4	3. 4	90.38	6	0.02	82.86	80.18	2.78
18	0·3561	0·4139	1·1620	0· 785	78. 0	80. 5	2. 5	77. 4	73. 4	4. 0	97.15	0	0. 1	84 91	79.97	4.94
19	0·4717	0·5799	1·2300		79.67	82. 5	2.83	82. 6	78. 4	4. 2	105 15	3	0.37	88.42	79.90	8.52
20	0·3752	0·4522	1·2050		79.67	81.33	1.66	81. 1	78. 4	2. 7	96. 7	1	0.37	87.73	78.83	8.90
21	0·2429	0·2820	1·1610		77.17	79.66	2.49	79. 0	75. 2	3. 8	90.73	7	0.14	85.08	78.73	6.35
22	0·4189	0·5133	1·2260	0· 033	77. 0	83.33	6.33	81. 2	78. 6	2. 6	98.14	8	0.59	87.73	76.29	7.44
23	0·4364	0·5279	1·2100		..	..	..	..	..	..	..	7	0.91			
24	0·5300	0·6726	1·2690		79.67	81.67	2. 0	82. 4	80. 2	2. 2	99.65	5	0.98	88.69	75.62	13.07
25	0 3948	0 5104	1·2930	0. 065	76. 0	78. 0	2. 0	79. 6	77. 6	2. 0	93.84	4	0.33	88.16	76.41	11.75
26	0·4127	0·4905	1·1890		80.33	82. 0	1.67	84. 1	82. 3	1. 8	99.01	6	0.64	89.69	78.36	11.33
27	0·4551	0·5416	1·1900	0· 270	82.33	84.33	2. 0	86. 8	84. 2	2. 6	102.38	2	0·38	89.28	78.12	11.16
28	0·4717	0·5529	1·1720		82·33	84. 0	1.67	87. 0	84. 2	2. 8	99.92	4	0·38	89.30	76.60	12.70
29	0·4975	0·5732	1·1520	0· 032	85. 0	86. 5	1. 5	88.25	85.12	3.13	101 33	8	0 35	88.15	77.58	10.57
30	0·3224	0·3885	1·2050	0·0015	..	..	..	..	..	..	..	8	0·15			
Mean.	0.4058	0.5028	1.2396	0.1868	79.4	81.63	2.23	82.0	78.85	3.15	101.36	4	0.42	88.56	78.92	9.64

Abstract of Observations of Evaporation during the Month of July 18

	At Red Hills.												At Madras.			
	Evaporation in Inches.		Proportional Evaporation on Land to that on Tank. Being 1.	Rain in inches.	Temperature of water in the Evaporator.		Difference.	Temperature of water in the Tank.		Difference.	Thermometer in Sun.	Proportion of cloudy sky in 8ths.	Force of wind. lbs. to 1 Sq. Ft.	Dry Thermometer.	Wet Thermometer.	Difference
July.	Tank.	Land.			Tank.	Land.		Top.	Bottom.							
1	0·4052	0·4855	1·1980	0· 150	83.33	85. 0	1 67	85. 2	82. 4	2· 8	102.38	2	0. 3	86.39	79.51	6.
2	0·2662	0·3058	1·1490		75.75	77. 5	1.75	79. 3	78· 0	1. 3	92. 0	7	0.01	84.40	79.35	5.
3	0.3628	0·4851	1·3370		84.67	86.67	2. 0	87. 2	84· 4	2. 8	104. 6	4	0.19	86.21	79.16	7.
4	9·3794	0·4738	1 2490	0·0025	83. 0	34 66	1.66	85. 2	82· 8	2. 4	101.84	6	0.14	86.46	80 23	6.
5	0·3873	0·4900	1·2650		85.67	87.33	1 66	88. 0	85· 2	2. 8	103.92	6	0.21	86.65	78.71	7.
6	0·3565	0·4514	1·2660		83.33	85.33	2. 0	85 0	82· 6	2. 4	102.38	3	0.36	86.84	78.06	8.
7	0·2608	0·2920	1·1200	2· 335	,,	,,	,,	,,	,,	,,	,,	6	0.15	,,	,,	,
8	0·4351	0·5179	1·1900		76.33	78 67	2.34	80. 4	78· 2	2. 2	94.77	7	0.74	87 21	75.14	12.
9	0·4347	0·5133	1·1810		80.83	83. 0	2·17	83· 0	79· 8	3. 2	101. 0	7	0. 9	88.49	76.49	12.
10	0·3815	0·4468	1·1710	0· 005	75.67	77. 0	1.33	79 6	77 8	1. 8	92.11	7	0.73	86.00	76.19	9.
11	0·3781	0·4356	1·1520	0· 005	75. 0	78.33	3.33	80. 0	77· 8	2. 2	95.96	7	0.51	88·51	77.31	11.
12	0·3141	0·3756	1·1960	0· 010	74.16	77.33	3.17	79. 0	77· 5	1. 5	93.38	7	0.48	86.48	76·65	9.
13	0.2579	0·2920	1·1320	0· 325	75.75	77. 5	1.75	79. 0	77· 5	1. 5	91.31	8	0.25	85.18	77.09	8.
14	0·2854	0·3266	1·1440	0· 331	,,	,,	,,	,,	,,	,,	,,	5	0.27	,,	,,	,,
15	0·3503	0·4093	1·1680	0· 215	79.33	81 33	2 0	82. 6	79. 2	3. 4	98·54	6	0.09	86.55	78.69	7.8
16	0·3877	0·4601	1·1870	0· 217	83. 0	84·33	1.33	85. 0	82. 0	3. 0	102.46	5	0.19	87·87	79·12	8.7
17	0·2379	0·2733	1·1490	0· 434	79.67	81·67	2. 0	81. 8	78. 6	3. 2	95,54	7	0.04	85·49	78.68	6.8
18	0·2279	0·2517	1.1040	0· 215	78.67	81. 0	2.33	82. 8	79. 4	3. 4	97·23	8	0.05	84.21	78.90	5.3
19	0·1198	0·1348	1·1250		75. 0	77. 5	2. 5	78 0	74. 3	3. 7	87 19	8	0.04	82 00	77.68	4.3
20	0·2929	0·3411	1·1650	0 215	80.67	82·67	2. 0	84. 2	82. 2	2. 0	99·46	7	0·22	83.26	79.04	4.2
21	0·2055	0·2325	1·1320	0· 217	,,	,,	,,	,,	,,	,,	,,	8	0.11	,,	,,	,,
22	0·2937	0·3378	1·1500	0· 213	82. 0	84·33	2.33	86. 2	83. 6	2. 6	100.31	5	0.07	84.37	78·65	5.7
23	0·2808	0·3144	1·1200	0· 435	77.33	79 33	2. 0	81. 0	78. 2	2. 8	94 54	8	0.16	84·20	77.63	6 5
24	0·3303	0·3865	1·1700	0· 435	79.16	81.33	2 17	83. 0	80. 6	2. 4	94.15	8	0.19	84.25	76.75	7.5
25	0·2929	0·3399	1·1600	0· 218	82.33	84. 0	1.67	84 6	82. 5	2. 1	98.38	8	0.14	85.40	77·94	7.4
26	0·2974	0·3469	1·1660	0· 217	80·25	82. 5	2.25	84. 3	81. 3	3. 3	94.77	8	0.12	84.25	77·29	6.9
27	0·2933	0·3399	1·1590	0· 218	81. 0	82 33	1.33	83. 6	81. 4	2. 2	98.31	6	0.25	85.29	78 63	6 6
28	0·3927	0·4692	1·1950		,,	,,	,,	,,	,,	,,	,,	7	0.44	,,	,,	,,
29	0·4684	0·6269	1·3380	0· 217	83.67	85.33	1·66	86. 6	84. 6	2, 0	100.73	7	1. 9	87.35	76·61	10 7
30	0·4285	0·4942	1·1530	0· 435	80.16	81·67	1.51	82. 2	80. 2	2. 0	93.92	8	0 59	86·88	76.65	10.2
31	0·2929	0·3390	1·1570		78.67	80. 5	1.83	81. 4	79. 6	1. 8	92.81	8	0.38	86.35	77·08	9.
Means.	0.3257	0.3867	1.1881	0.2279	79· 9	81·94	2·04	83.09	80·58	2·45	97·19	6.8	0·33	85·80	77.89	7.9

Abstract of Observations of Evaporation during the Month of August 1844.

August.	At Red Hills.													At Madras.			
	Evaporation in Inches.		Proportional Evaporation on Land to that on Tank, being 1.	Rain in inches.	Temperature of water in the Evaporator.		Difference.	Temperature of water in the Tank.		Difference.	Thermometer in Sun.	Proportion of cloudy sky in 8ths.	Force of wind. lbs. to 1 Sq. Ft.	Dry Thermometer.	Wet Thermometer.	Difference.
	Tank.	Land.			Tank.	Land.		Top.	Bottom.							
1	0.3478	0.3948	1·1350	0· 015	80. 0	81.33	1.33	81· 5	79. 2	2· 3	94,46	7	0.42	86.44	76.88	9.56
2	0.4052	0 4934	1·2170		80. 0	81·83	1 83	81 5	79· 8	1· 7	94. 5	7	0,44	86.82	76.45	10.37
3	0 3877	0 4601	1·1860	0. 035	79.33	81.16	1.83	81. 0	78· 6	2. 4	93.96	7	0.07	85.65	77.47	8.18
4	0.4564	0.5425	1·1910	0· 020	,,	,,	,,	,,	,,	,,	,,	7	0.24	,,	,,	,,
5	0 3823	0.4630	1·2110	0· 033	81. 0	83. 0	2. 0	83. 8	81· 8	2. 0	100.18	6	0.28	86.07	77.93	8.14
6	3.4102	0.5050	1·2310	1· 808	82.66	84 33	1.67	84. 6	82· 7	1. 9	100. 0	5	0.27	85.50	78.72	6,78
7	0.3137	0.3615	1·1520	0· 295	79.66	81. 0	1.34	81. 4	79· 4	2. 0	95.38	7	0.18	84.65	78.13	6.52
8	0.3103	0.3611	1·1640	0· 155	78. 0	79. 5	1. 5	79. 4	77· 6	1. 8	94.65	8	0.13	82.98	77.90	5.08
9	0.3178	0 3673	1·1560	0· 033	80.66	82. 5	1.84	82. 4	80· 9	1. 5	99.31	6	0.08	84.93	79.45	5,48
10	0.3282	0.3860	1·1760	0· 017	80.33	82. 0	1.67	82. 3	80· 5	1· 8	97,77	5	0.14	85.83	77.94	7.89
11	0 3811	0.4547	1·1930	0· 255	,,	,,	,,	,,	,,	,,	,,	7	0.52	,,	,,	,,
12	0.3769	0 4447	1·1800	0· 630	77.16	78 83	1.67	80. 5	78· 6	1. 9	98.81	5	0. 5	86.65	77.83	8.82
13	0.3074	0 3503	1·1390	0· 155	77. 5	79. 5	2. 0	79. 8	77· 8	2. 0	97.61	7	0.46	85.80	78.41	7.39
14	0.2987	0.3449	1·1550	0· 083	81.16	83. 0	1.84	82. 1	80· 2	1· 9	107,38	7	0.29	85.10	79.17	5.93
15	0 3478	0.3948	1·1350	,,	81.16	83. 0	1.84	83. 5	81· 3	2. 2	99.46	8	0.25	85.00	78.92	6 08
16	0.3632	0 4218	1·1610	,,	82.16	83.83	1.67	84. 6	82· 7	1. 9	103.23	6	0. 1	86.38	79.67	6.71
17	0.3224	0.3885	1·2050	,,	81.67	83.16	1.49	83. 4	81· 5	1. 9	101.61	5	0. 2	86.20	80,23	5.97
18	0.3769	0.4447	1·1800	,,	,,	,,	,,	,,	,,	,,	,,	4	0.17	,,	,,	,,
19	0.3594	0 4156	1·1560	,,	82.33	83.83	1 50	83. 2	81· 3	1. 9	102.92	8	0. 1	86.93	80.79	6.14
20	0 4064	0.4572	1·1250	,,	81.33	82.83	1.50	82 5	81· 0	1. 5	99.54	6	0.18	86.95	79.07	7.88
Means.	0 3600	0 4225	1·1736	0·1767	30 35	82·03	1.68	82 21	80·29	1.92	98 43	6	0.25	85.76	78.53	7.23

VIII.—*Translation of a Mahratta Document " Account of the Tribes of Mahratta Bramins. No.* 851 *of the Mackenzie MSS.—See Madras Journal vol.* viii *p.* 76—77*)* *Mark* 19 *or* 93¹. By C. P. Brown, Esq.

There are five classes of Bramins among the Mahratta Bramins, called Pancha Dravidas—viz. Cannadi, Tatwaji, Telagas, Aravas, and Guzerati.

The Mahratta bramins are a tribe well known as good soldiers. The Tatwajis intermarry with them; some adhere to the Bhagavat sect; others are Smartas; some are Gōsāvīs who read the tales of Krishna; some read the Sastras and Vedas, setting themselves up for (Vaidicas) *Religieux*; these adhere to the Rug Vedam; and [they consider themselves to be] of the Viswamitra (gotram) stock, or the Causica stock. The Desastha bramins are of the Mahratta race; but they have left the Mahratta country and roamed elsewhere for a subsistence, therefore they are called (Desasthas) foreigners; but they are all of the original caste.

Some of them take service as sepoys; others as menials; some live as *Religieux* reading the Sastra and Veda. Some read the Rig Veda; others the Yajur Veda; some are (*mirāsidārs*) landholders and hold the offices of dēsāhi, dēsapāndya, dēsamukhi, Kulkarni, Sahucār (clerks and money-changers) as it may happen. Some are worshippers of Krishna (literally, readers of the tale of Hari,) and are styled Gōsāvi (Goseyns). On the banks of the Godaveri there is a town named Paithāna, where a Desasthi named Ramadass dwelt, founder of a sect whence he is called a Gōsāvi; having been a long time engaged in performing religious austerities, these at last gained him the favor of Iswara (Siva). This

hermit daily fed four thousand bramins. He is the chief of the Desasthas, and by reason of his learning he is styled the "Noblest in the Conclave." These are of the Bharad-vāja and Vasishtha families.

The Konkana bramins are a class by themselves: named from their native place. They are divided into fourteen families; His highness Bajee Rao (the Paishwa) and Nana Saheb sprung from his race. They left their country and settled at Satara which they erected into a mighty power; their capital being Poona: and promoted many of their fellow countrymen. All these read the Rug Vedam. They bear different family names.

The Carāli Bramins are described thus.* Of these there are twelve sorts: they live at Samanta-vadi, in the Concan. They claim descent from Valmik &c. Certain (rishis) saints cursed him to disgorge the texts which he had learnt, and doomed him to be a Chandala (outcast) for an hour and a half daily at noon.†

These bear the name of Prathama Sakhas or First Learners. (i. e. Those who were first taught the Vedas.) At noon no bramin goes into their houses.‡ They are great worshippers of the Bona Dea (Sacti-puja) and beguile Telugu Bramin youths into their houses; such an one they feed luxuriously and give him a female to attend him, so that attachment for her may keep him there until the anniversary of the "Nine Nights." On this occasion they feed him amply and then bring him before (Devi) the good Goddess, and as he bows down to her they slay him. This is done in every house; §

* In Molesworth's Dictionary of the Mahratta language, page 596 the word "Panchamisal" is explained "A medley: bramins of the mixed blood, of the Kurar, Chit-pavan Desasth &c." In Sanscrit *Karala* denotes *horrid, frightful.* In this place it probably is a fictitious word.

† This probably means that circumstances obliged him to live by some business, such as teaching for his bread: which by the law subjects a man to a curse.

‡ This perhaps denotes that they are engaged in tuition: and as they then lock themselves up, they are suspected of the practices mentioned in the next lines.

§ This alone is sufficient to shew the falsehood of this story.

every Karali bramin in Poona uses these practices; they believe that the goddess rewards them with twelve years prosperity. This came to the ears of Sri Mant Náná Saheb, who thereupon seized all the Karali bramins in Poona and shaved their heads.*

Since that time they have desisted from slaying bramin youths. At present when the Karali bramins wish to perform the worship of (Devi) the goddess, they invite a bramin of this country, shew him every sort of kindness, but feed him with poisoned food which causes death in the space of a month; this goes on at the present day.† They are of the Vamana and Karidra families.

Regarding the Chīpōnī bramins; Parasurama by penance obtained the favour of Siva, and from him descended the seven families bearing this name. They use the Rug-vedam and the Atharvana Vedam,‡ and they practise (pampu-sati) demoniac rites; some of them are Religieux, and others are lay-bramins (Laukilkas) they use the magic that sends demons into men; some perform the solemn (yajna) sacrifice. The Concan bramins contract marriage with the daughters of the Chīpōnīs: but never will bestow their daughters on them.

The document here translated seems to have been procured by Colonel Mackenzie in the year 1807, and has attracted some notice because supposed to give curious particulars regarding certain sects of bramins. But it may be more useful as a warning how little we can depend on the information which bramins offer us regarding rival sects. This translation is slightly abridged, a few needless lists of names being omitted. I need not point out its incoherencies. The

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* This being the utmost degradation: that this was done is not impossible: but this does not prove that the sufferers were guilty.

† An assertion just as incredible as the preceding fables.

‡ The Athervana Vedam is a treatise on magic.

Sakti-puja among the bramins is somewhat like *Freemasonry* among the Italians; an expression intended to convey ideas of every horror, while in point of truth the fullest investigation has shewn, (whatever the Abbé Dubois asserts to the contrary,) that this worship of the Bona Dea has never extended into southern India though advocated by several bramins.* When they find an Englishman credulous on this subject they furnish him with many anecdotes, the fruit of a fertile invention: and such may be found scattered through Dr. Francis Buchanan [Hamilton's] Mysore: and in the same author's posthumous work in three large volumes bearing the title "Eastern India" which Mr. Montgomery Martin has published in his own name as if he was himself the author.

IX.—*Contents of the Kērala Māhātmya, by the Revd. Dr. Gundert.*

The Kērala Māhātmya or Keral' olpi (in 104 chapters) pretends to be a Purana which Rishi Garga expounded to the Pandicides during their exile. It is written in a poor sort of Sanscrit; and has hardly any poetical merit. A literal translation of it in Malayalam, and a copious Index; which however in several places seem to be based on another text than the present, help to recognize the Malayalam appellations in their Sanscrit dress.

The three first chapters bear a separate title Cshatravarnanam. They relate the growth of Cārta-Viryārjuna's power who ruled on the shores of the Narmada over eight countries (Avanty-ādy-ashta desheshu) and thro' penance received power to subject even Gods and Brahmans to his sceptre. The Gods consult: Narada prepares two charmed balls, one filled with Cshatria glory, the other with Brahma-tejas and gives them to the wives of the Brahman Jamadagni, and of the Cushica king. The balls are interchanged, and the princess gives birth to the sage Vishvamitra, whilst the Brah-

* Every existing Sanscrit book on the Sacti worship may be inspected in the Library of the Madras Literary Society.

man's son, the incarnation of Vishnu enters the world with the mace (parasu) in his hand. He is called Parasu Rama. One day his father, doubting Renuka's fidelity, orders the boy to slay his mother. He does so; and is directed by the Rishis to atone for his sin by destroying Carta Virya and the Cshatrias, the enemies of the Brahmans; a task which he effected in twenty-one expeditions.

§ 4-11. There ruled once in the Treta-yuga a certain Parasu Rama, who wished to crown his prosperous reign by a perfect donation to Brahmans. He assembled all the Rishis and gave the sixteen gifts in profusion; but Vishvamitra observed, that the most sin destroying gift was a grant of land. Accordingly the king made over to the Rishis all the earth within the four seas, with all the blood guiltiness attached to it, by making them drink the water of possession (a ceremony still observed in transfers of ground). The Brahmans thought proper to turn him out of the property he had given away. but with Subrahmanya's assistance he obtained, by penance, from Varuna the grant of some land to dwell on. The throw of his mace was to determine the extent of the ground: it flew from Canyā Cumāri to Gocarna, and the whole intermediate country of ten yojana's breadth (Malay: version, one yoj), and 100 yojana in length was rescued from the sea. The gods pay a visit to the new country, call it Kerala, the holy land of Parasu Rama; and Shiva condescends to be henceforth worshipped in Gocarna the metropolis (Srī mūla sthānam).

§ 12-47. Brahmans are collected by Parasu Rama to colonize the land: first a poor Brahman from the shores of the Krishna, whose eight sons receive the title of Yogasharyas the eldest being appointed head of all the Brahmans and settled in Vrishādripura (near Gocarna,—others say in Trishivaperur: Trichoor). Other Brahmans are introduced, and settled in different localities; until the number of 64 gramas, or

colonies, is completed. Of these Brahadvana, Sangameshapura and Ganagrama are the three particularly mentioned :— follows an importation by ship of seeds, and all kinds of animals : with eighteen Lamantas or sons of Cshatria's widows from Brahmans Vaishyas (Mal : version Chettis) Sudras and low casts.—Some of the Brahmans emigrated : to obviate which, distinct customs were instituted for the Kerala Brahmans. One Tarana received the hereditary rule over the temples (ālayanam tantrani) which now arose in many places. They are chiefly Ghata puri (Coombla) Maruca (?) Trichamram close to Taliperambu, and to the salubrious seven hills (Saptashailas. Yeli mala M. Mt. Dilli) Caripuri, or Parasu Ramapuri (a residence of the Colattiri ; M. Carippattu) Subrahmanyapuri with a yearly feast to the god of war, and the residence of the only Cshatria whose life was spared by Parasu Rama. (He is called a Mushica Cshatria, and appears to be the Raja of Coombla) Nileshwara with a Samanta prince (Nelisseram) Mūkāmbica, with a Bhagavati temple. Cāveri and other jungle temples, with worship of demons, sprung from Shiva, Lacshmīshapura (Taliparambu, the glories of which are described in glowing terms : its prince is said to belong to the Mushica Cshatria's family, Bālashailam (Cherucunnu) Sahāymalaka (Tirunelli in Waynādu, the chief place for offering Shrāddham) Vihāra puri (Pallicunnu, Saraswati temple) 'Swetāranya puri (Tiruwangadu, near Tellicherry) Trishirahparvatam (Tricherucunnu) with a yearly feast in May, by the celebration of which alone the independence of the country could be secured ; Curumbipuri (worship of a hunting deity and residence of a Samanta the Curumber Raja) Gopacūda puri (the original residence of the Erādi, or Samorin) Vilvādri (Cuvalam) Vātālayam (Guruvāyūr in the Cochin territory whither pilgrims resort to be freed from disease) Sri Cotarapuri (Codungalūr with service of Bhadracali, and rich bazars) Tripūrna (Tripunattunpura now capital of the Cochin Raja) with a Sāmanta and rich Concana merchants. Bālā-

puri (Cochi) near the sea: Simpapuri residence of the Samanta Bhānu Vicrama, Anantashayanam (Trevandram or Tiruananta-puram) Sri Vardhanapuri [Tiruwitan cōdu] full of bazars and elephants the residence of four Samanta brothers; of whom the first Bhanu Vicrama is to rule over Kerala, whilst his younger brother Rana Vicrama is annointed as Viceroy in Gocarna. Lastly Suchindra [Indra's temple] and Canyā Cumari.

§47-53. From this journey Parasu Rama returned to Gocārna, and decided several doubtful cases, which gave rise to the different casts of half Brahmans [Ardhabrahmanas] Ambalavāsi [temple servants] Nambidis, singers, dancers, &c. Brahmans were ordered to live with the women of these castes, as well as with the Sudra wives, in order to multiply Brahmaṇical descendants throughout the country. Some of the half Brahmans [Nambis] were instructed in the use of arms, to defend temples and Brahmans all over Kerala; which for military purposes is divided into three provinces, each with a head fencing school.

Whilst Parasu Rama was engaged in holy services at Subrahmanyapura, a Demon came with Bauddhists, and killed the prince he had placed over the Gocārna province. He went to seek a ruler for the northern parts; and on the seven hills fell in with three princesses whom he gave into the charge of the Brahman deputies of Lacshmipura, telling the Yogasharya to anoint the first prince born by them. [The intention of the Purana is evidently to describe Kerala as being first under the rule of the united Travancore and Colattiri dynasty, the sway of which being contracted by foreign aggression in the North, paved the way for the independent rule of the Colattiri branch].

§ 54-60. Afterwards Parasu Rama went with the Brahmans of these 64 colonies to his residence near the Vrihannadi (M: Pēr-āru, the Ponani river) and ruled the country for 5300

years. He then assembled the Brahmans, and promised to give them rulers, each for 12 years, and brought from the southern shore of the Caveri an excellent Samanta, whom the Brahmans crowned king on the shore of the Vrihannadi [probably a viceroy of the Chola king]. On the Mahamakha feast of the 12th *year they deposed him, and chose another. Twenty-one kings having thus ruled in succession, the last ran away with the crown jewels. The Brahmans were in consternation, but Parasu Rama promised again indigenous rulers, and located two princesses at Sri Vardhana [Travancore] and Mangalapura. The 3d Subhangi at Lacshmīsapura, married to a Brahman. Her son Udaya Varma [head of the Colatiri family] was crowned by the Brahmans as king of the northern half, and presented by Shiva with a ring. He destroyed the Racshasas [Tulu aborigines ?] with their families, and furnished a prince Allōhala, to whom Parasu Rama had confided the care of the Subrahmanya temple, for the pride with which he had usurped the Brahminical territory of eight yojanas extent. Parasu Rama blessed the king, exhorted him to righteousness, and prophesied that one of his successors would prefer wicked Brahmans from the Tunga bhadra to the priests of the country; and thus become the author of a general confusion of castes, which would prove the ruin of the country.

From thence Parasu Rama proceeded to Gopacudapuri (Eranadu) and founded the Samorin's dynasty (M. Tāmūttiri) by depositing a Sāmanta virgin with the Brahman chiefs. Her son ruled in Curupuri, endowed with Parasu Rama's sword.—Lavaputra, descendant of Ayodhya Cshatrias, was placed at Bālāpuri (Cochi): his grandson by a daughter married to a Brahman was Rāma Virya, whose dynasty Parasu Rama's white umbrella (M. Vencotta cuda) is inherited.—But finally Parasu Rama declared whole Kerala to be the property of the Brahmans of sixty-four Grāmas, assembled at Gocārna.

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* Cycle of Jupiter.

§ 61-73. One of the Rishis took it into his head to undo Pârasu Rama's creation, by preventing the celebration of the yearly feast at Trisiracunnu (§ 35) in order that the fools of Bauddhas might enter the country. Soon after a clever Buddhist woman named Māli appeared on the seven hills; fascinated a Rishi; and procured to the son she bore to him, the right to the crown; by secretly exchanging her infant against that born to the Queen of the 11th Colattiri King. The stolen child was called Mamāli (name of the Cannanur Bibi, and of the Laccadives belonging to her) and brought up under Cannan's fostering care. A powerful minister Crōda who alone knew of the exchange, abode with the supposed prince, till he was of age, and made him King. But Bhadracali on the coronation day refused to protect a prince, whose mother was a Buddhist, calling him Nasamipa, Nasanga, not permitted to approach, from which he took occasion to build a town and chapel Nasamipapuri (Māday or Payangadi, south of the seven hills) where as the Index says the first Buddhist vihāra or palli (chapel, mosketi) was erected. By the ministry of Croda, this 12th King entirely changed the rules of the state; and though kind to Brahmans so as to load them with all manner of gifts, he ruled only through Buddhist officers and subjected to them, the whole country from Canya Cumari to Gocarna (akhitām bhumim ākramya Buddheis sākam sthita tatat Rājābhut Kerala 'khite) made it abound in pallis and bazars, and during a reign of 35 years set altogether aside the laws of Parasu Rama. When the latter returned, he extirpated the Buddhists, and lopped off the hands and feet of the King. But he, not dismayed, praying to his father the Rishi, had his members restored by degrees; and with the assistance of thirty-five Bhūtas built Vriddhipura (Valarpatnam or Billipatam) ruled there also with Buddhas (whom the Index here calls Mapillas) and stole even the holy sword from Taliparambu, so that he reigned securely without an enemy. But Parasu Rama by his course of devotions brought

the happiness of the infidel King to a sad end. He was detained in the chase by Shiva in disguise; whilst the Queen fell in love with Croda the minister and made offers to him; the flat refusal of which prompted her to devise a speedy revenge. She acts all the part of Potiphar's wife; but the faithful servant, when on the point of being executed, is discovered mounted on the heavenly chariot; and parting, advises the King to go to Mecca, and worship there Vishnu incarnate in all shapes (Vishwa rupavatara) in order to go to Vishnu's heaven. The King did so; and left his maid servant Sphulli to rule in Madai, with Buddhist aid, for evermore. Parasu Rama wished to restore the undiminished sway of the Colattiri princes; but this was rendered impossible by a compromise made in the meanwhile by the rival Queens Sphulli and Subhangi. The taint, brought by this occurrence on the Colattiri family, could only be expiated by the ceremony of Hiranya Garbha; that is, by the creeping of all princes and princesses thro' a golden cow, and by the gift of that, and of a silver bullock to the Brahmans. This holy act to be repeated every 12th year.

§ 74-85. Description of the national feast, maha makham, celebrated at Navayogipura (M. Tirunavai) on the northern bank of the Vrihannadi, where the Brahmans of the sixty-four colonies, the four kings (S. bhūpās Colattiri, Travancore, Samorin, Perimpadappu or Cochin] assemble with all the aristocracy, the 1400 lords [vīrās, M. idaprabhu] 1000 Nāyakas; and all their vassals. Also the Tulu Raja [Tulasibhūs S.] makes his appearance with his Racshasa Nayers. ParasuRama, being there crowned again as king of kings, annexes great promises to the repetition of the feast in every 12th year. [It was celebrated the last time A. D. 1743)—[An account of the 18 gymnastic and warlike exercises (18 āyudhābhyāsa] with the institution of pallestras and headmasters in the four great districts of Kerala. The origin of some caste divisions is explained.

§ 86-95 Particulars about the southern province [Dacshina Kandasya Mahatmya]. Aditya Varma the sister's son of Bhānu Vicrama is made king at Srī Vardhana pura to rule over the land from Canya Cumari to the Ghoza river; comprising 21 Brahman colonies. Parasu Rama tells him that one of his successors will call for northern Brahmans and honour them above others: from their usurpation, internal commotions will ensue, Brahmans become merchants &c. until Sakas and Buddhas come and overrun the country. A fourth of the whole country is to be set aside, and dedicated to the serpents or Nāgas, the former rulers of the country. Description of the temples at Suchindra, Tiruwanantam &c. also of Bhutapāndya, a holy spot on the eastern border, where the aggression of a Pāndya prince was stopped by divine intervention.

§ 96-100. Colattiri affairs. An Asura Darika attacked the country and encamped on the Srī Mauna Mula Mt. King Kerala Sekhara, the sister's-son of Cula Sēkhara was advised by Cali, the guardian of the land, to build a palace in the S.E. corner of the seven hills. [Index: the Madai palace] when she would come and manifest her glory. The king began the work, and staid with his army on the seven hills. Cali appears and is worshipped by the Asuras with great revellings till she arose, slew Dárika, and frightened the Asuras into subjection. Several new temples are built, and dedicated to Shiva, Cali, Vishnu.

§ 101-102. Genealogy of Colattiri and Travancore (vamsa pāramparya.) Kerala Varma was followed in his just rule over the *middle* province by his sister's-son Arka Tejasah, he by his famous sister's-son Ravi, he by his nephew Vicramāditya, he by his nephew Sunābha. The succession of Kings in the *Southern province*: Bhanu Vicrama, then his sister's-son Rana Vicrama; whose nephew, being made king, had from a Brahman woman a son Vandhivirya Chaturbāhu, that followed

him on the throne. His nephew Jayasākhara, followed by his sister's-son Vijaya Vicrama who rules *now* in the beginning of the " Dwapara yuga" and was by Parasu Rama's order made also king over the *northern* province (in Mangalapura) extending from the Cotishwara to the Cumbha river. This northern province is ruled by Viceroys [ardha simhasana] the first Ardha Chuda Prabhas, then his nephew Mohana Vamsajah; his nephew Sringasura; his nephew Indu Sekhara; his nephew Māna Sekhara, who rules at present for evermore, whilst the Valabhut Bala Sekhara [Colattiri] with 4 mantris and 350000 Nayers is enthroned in Angaviddhi [Valarpattanam]. The latter, at a temple dedication, exhorts once more to the practice of virtue; lest Kerala fall into the hands of Sakas and Bauddhas.

§103, What a useful book! whoever reads or teaches it is freed from all sin &c. with promises of this kind Parasu Rama departs to return to his meritorious penances on the Himālaya.

§104, A long time having elapsed, the Brahmans assembled at Gocarna proposed to try Parasu Rama as he had left them word he would re-appear whenever they should jointly meditate on him. Having made every effort, they saw at last the god coming: but when asked what they wanted him for, they stood ashamed. So he cursed them to live henceforth without his help; and to hold no more their united council at Gocarnam. Yet would he visit Kerala annually after the monsoon on the Onam [Shrāvana] festival: let therefore the Brahmans wait for me! The Rishi concluding this Bhargava Mahatmyam, Keralotbhavam, with the customary praises of its sanctifying powers, received from his hearers remuneration in the shape of 100,000 cows, 1000 elephants and other royal donations.

X.—*Meteorology of Bombay, by Colonel Sabine, from a a paper read before the British Association* 1845.

In a communication which I had the honour to make to the section at the last meeting of the British Association, on the subject of the meteorological observations made at Toronto in Canada in the years 1840 to 1842, I noticed some of the advantages which were likely to result to the science of meteorology from the resolution of the barometric pressure into its two constituents of aqueous and of gaseous pressure. It was shewn, that when the constituents of the barometric pressure at Toronto were thus disengaged from each other and presented separately, their annual and diurnal variations exhibited a very striking and instructive accordance with the annual and diurnal variations of the temperature. The characteristic features of the several variations, when projected in curves, were seen to be the same, consisting in all cases of a single progression, having one ascending and one descending branch; the epochs of maxima and minima of the pressures being the same, or very nearly the same, with those of the maxima and minima of temperature, and the correspondence in other respects being such as to manifest the existence of a very intimate connexion between the periodical variations of the temperature and those of the elastic forces of the air and vapour. The curve of gaseous pressure was inverse in respect to the other two; that is to say, as the temperature increased, the elastic force of the vapour increased also, but that of the air diminished, and *vice versa;* and this was the case both in the annual and the diurnal variations.

Such being the facts, I endeavoured to shew, in the case of the diurnal variations, that the correspondence of the phenomena of the temperature and gaseous pressure might be explained, in accordance with principles which had been long and universally admitted in the interpretation of other meteorological phenomena, by the supposition of an extension in height and consequent overflow in the higher regions of the atmosphere, of the column of air over the place of observation during the hours of the day when the surface of the earth was gaining heat by radiation, and by the contraction of the column during the remaining hours when the temperature was diminishing, and by its consequent reception of the overflow from other portions of the atmosphere, which, in their turn, had become heated and elongated.

According to this explanation, there should exist, during the hours of the day when the temperature is increasing, 1st, an *ascending current* at the place of observation, of which the strength should be measured by

the amount of the increments of temperature corresponding to given intervals of time; and 2d, a *lateral influx of air at the lower parts of the column* of proportionate velocity, constituting a diurnal variation in the force of the wind at the place of observation, which should also correspond with the variations of the temperature in the epochs of its maximum and minimum and intermediate gradation of strength. The anemometrical observations at Toronto were shewn to be in agreement with the view which had been then taken, confirming the existence of a diurnal variation in the force of the wind, corresponding in all respects with the variation of the temperature.

Admitting the explanation thus offered to be satisfactory in regard to the diurnal variations, it was obvious that the correspondence of the annual variations of the temperature and pressures might receive an analogous explanation.

A comparison of the results of the observations at Toronto with those of the observations of M. Kriel at Prague in Bohemia, shewed that the characteristic features of the periodical variations at Toronto were not peculiar to that locality; but might rather be considered as belonging to a station situate in the temperate zone, and in the interior of a continent. The annual and diurnal variations at Prague were also single progressions, and the same correspondence was observable between the variations of the temperature and of the gaseous pressure.

The publication of the volume of magnetical and meteorological observations made at Greenwich in 1842, which took place shortly after the meeting of the Association at York, enabled me to add a postscript to the printed statement of my communication in the annual volume of the Association Reports, shewing the correspondence of the results at Greenwich with the relations which had been found to exist in the periodical march of the phenomena at Toronto and at Prague.

From the concurrence of these three stations, it was obvious that considerable insight had been obtained into the laws which regulate the periodical variations in the temperate zone; and into the sequence of natural causes and effects, in accordance with which the annual and diurnal fluctuations of the elastic forces of air and vapour at the surface of the earth depend on the variations of temperature: and from these premises it was inferred, that the normal state of the diurnal variations of the pressures of the air and vapour, and of the force of the wind in the temperate zone, might be that of a single progression with one maximum

and one mininum, the epochs of which should nearly coincide with those of the maximum and minimum of temperature.

That exceptions should be found to this state of things in particular localities in the temperate zone, was far from being improbable: it could not be expected that the influences of temperature should always be so simple and direct as they appeared to be at Toronto; and a more complex aspect of the phenomena might particularly be looked for where a juxtaposition should exist of columns of air resting on surfaces differently affected by heat (as those of land and sea) and possessing different retaining and radiating properties. In such localities *within the tropics* the well-known regular occurrence of land and sea-breezes for many months of the year made it obvious that a double progression in the diurnal variation of the force of the wind must exist, and rendered it highly probable that a double progression of gaseous pressure would also be found.

It was therefore with great pleasure that I received through the kindness of a Dr. Buist a copy of the monthly abstracts of the two-hourly meteorological observations made under that gentleman's superintendence at the Observatory at Bombay in the year 1843, accompanied by a copy of his meteorological report for that year, possessing a particular value in the full account which it gives of the periodical variations of the wind, and in the explanation which is thereby afforded of the diurnal variation of the gaseous pressure at Bombay, which presents an aspect at first sight more complex than do the three above-named stations in the temperate zone, but which I believe to be equally traceable to variations of the temperature.

TABLE I.—*Bombay*, 1843. *Mean temperature, mean barometric pressure, mean tension of vapour, and mean gaseous pressure, at every second hour.*

Hours of Mean Bombay Time, Astronomical Reckoning.	Temperature.	Barometer.	Tension of Vapour.	Gaseous Pressure.
	deg.	inch.	inch.	inch.
18	78·4*	29·805	0·750*	29·055
20	79 6	29·840	0·766	29·074
22	81·8	29·852†	0·771	29·081†
0	83·2	29·817	0·768	29·049
2	84·1†	29·776	0·795	28·981
4	83·9	29·755*	0·800	28.955*
6	82·3	29·774	0·802†	28·972
8	81·2	29·806	0·801	29·005
10	80·3	29·825†	0·780	29·045†
12	79·8	29·809	0·775	29·034
14	79·4	29·786	0·766	29·020
16	78·9	29·778*	0·761	29·017*
Mean of the Year . .	81·1	29·802	0·780	29·022

* signifies 'minimum.' † signifies 'maximum.'

The Observatory at Bombay is situated on the island of Colabah in N. lat. 18° 54', and E. long. 72° 50', at an elevation of 35 feet above the level of the sea. In the copy of the observations received from Dr. Buist the monthly abstracts are given separately for each month, of the standard thermometer; of the wet thermometer, and of its depression below the dry; and of the barometer. In Table 1. I have brought in one view the thermometrical and barometrical means of the observations at every second hour, and the mean tension of the vapour and mean gaseous pressure at the same hours.

The tension of the vapour at the several observation-hours has been computed from the *monthly means*, at the same hours, of the wet thermometer, and of its depression below the dry thermometer. The values are consequently somewhat less than they would have been, had the tension been computed from each individual observation of the wet and dry thermometers, and had the mean of the tensions thus obtained been taken as the value corresponding to the hour. The difference is, however, so small, that for the present purpose it may be regarded as quite insignificant. It would not amount in a single instance to the hundredth part of an inch; and as in every instance the difference would be in the same direction, the *relative* values, which are those with which we are at present concerned, would be scarcely sensibly affected. The pressures of the dry air (or the gaseous pressures) are obtained by deducting the tension of the vapour from the whole barometric pressure.

The sun is vertical at Bombay twice in the year, viz. in the middle of May and towards the end of July. The rainy season sets in about the commencement of June (in 1843 on the 2d of June) and terminates in August, but with heavy showers of no long duration continuing into September. During the rainy season, and in the month of May, which immediately precedes it, the sky is most commonly covered with cloud, by which the heating of the earth by day, and its cooling at night by radiation, are impeded, and the range of the diurnal variation of the temperature is greatly lessened in comparison with what takes place at other times in the year.

The strength of the land and the sea-breezes in those months is also comparatively feeble, and on many days the alternation of land and sea-breeze is wholly wanting. During the months of November, December, January, and February, the diurnal range of the temperature is more than twice as great as in the rainy season, and the land and sea-breezes prevail with the greatest regularity and force.

TABLE II.—*Bombay,* 1843. *Comparison of the temperature and of the gaseous pressure in the months of May, June, July, and August, when the sky is usually covered with clouds; and those of November, December, January, and February, when the sky is usually clear.*

Hours of Mean Time at Bombay, Astronomical Reckoning.	Temperature.		Gaseous Pressure.	
	November, December, January, and February.	May, June, July, and August.	November, December, January, and February.	May, June, July, and August.
	deg.	deg.	inch.	inch.
18	74·1*	81·9*	29·344	28·782
20	75·3	83·1	29·368	28·806†
22	78·1	84·3	29·391†	28.798
0	80·8	85·1	29·353	28·782
2	81·9†	85·6†	29·230	28·746
4	81·7	85·4	29·195*	28·724*
6	79·6	84·3	29·199	28 740
8	78·4	83·4	29·248	28·754
10	76·9	83·0	29·308	28·800†
12	76·2	82·7	29·316†	28·775
14	75·7	82·6	29·295	28·754
16	74·9	82·2	29·285*	28·753*
Means.	77·8	83·7	29·298	28·763

In addition to the monthly tables, we may therefore advantageously collect in one view, for purposes of contrast, the means of the months of May, June, July, and August, as the season when the sky is generally clouded: and of the months of November, December, January, and February, as the season of opposite character, when the range of the diurnal temperature is greatest, and the land and sea breezes alternate regularly, and blow with considerable strength.

These seasons are contrasted in Table II., which we have given at the foot of the preceding column.

If we now direct our attention to the diurnal variations, commencing with those of the temperature, we find the projections exhibiting a single progression, having a minimum at 18^h and a maximum at 2^h; the average difference between the temperature at 18^h and 2^h being 7·770° in the clear season, 3·71° in the clouded season, and 5·7° on the mean of the whole year; and we perceive that the mean diurnal range of the thermometer is more than twice as great in the clear as in the clouded season.

The tension of the vapour exhibits also the general character of a single progression, increasing from a minimum at the coldest hour to a maximum about the warmest hour, and decreasing uninterruptedly from the maximum to the minimum.

* signifies 'minimum' † signifies 'maximum.'

The very slight irregularity which shews itself at the hour of noon requires to be confirmed by the observations of subsequent years before it can be regarded as possessing a systematic character. When, however, we direct our attention to the gaseous pressure, we perceive very distinctly marked the characters of a double progression, having one maximum at 10^h, and another at 22^h; one minimum at 4^h, and another at 16^h. The double progression is exhibited both in the clouded and in the clear seasons with a slight difference only in the hours of maxima, the principal maximum in the cloudy season being at 20^h instead of 22^h, and in the inferior maximum in the clear season being at 12^h instead of 10^h. The range of the diurnal variation, like that of the temperature, is more than twice as great in the clear as in the clouded season.

If we now turn our attention to the phenomena of the direction and force of the wind, we find by Dr. Buist's report that, for two hundred days in the year, there is a regular alternation of land and sea-breezes. The land-breeze springs up usually about 10^h, or between 10^h and 14^h, blows stronger and fresher towards daybreak, and gradually declines until about 22^h, at which time the direction of the ærial currents change and there is generally a lull of an hour or an hour and a half's duration. The sea-breeze then sets in, the ripple on the surface of the water, indicating its commencement, being first observed close in shore, and extending itself gradually out to sea. The sea-breeze is freshest about 2^h, and progressively declines in the evening hours. The diurnal variation in the force of the wind during these 200 days is therefore obviously a double progression, having two maxima and two minima—one maximum at or near the hottest, and the other at or near the coldest hour of the day, being the hours when the difference of temperature is greatest between columns of air which rest respectively on the surface of land and sea, and two minima coinciding with the hours when the surface temperature over the land and over the sea approaches nearly to an equality.

In the remaining portion of the year, the diurnal range of the temperature is most frequently insufficient to produce that alternation in the direction of the wind which prevails uninterruptedly during the large portion. There appears, however, to have been only one month, viz. July, in the year 1843, in which there were not some days in which the alternation of land and sea-breezes was perceptible. The causes which produce the alternation are not therefore wholly inoperative, though the effects are comparatively feeble during the clouded weather which accompanies the south-west monsoon.*

* There are no data in Dr. Buist's report from which the diurnal variation in the force of the wind may be judged of on the days during the south-west monsoon, when no alteration takes place in its direction. It would seem probable that on such days the variation should be a single progression, weakest towards daybreak, and strongest about the hottest hour of the day.

If we now view together the diurnal variations of the wind and gaseous pressure, we find a minimum of pressure coinciding with the greatest strength of the sea-breeze, a second minimum of pressure coinciding with the greatest strength of the land-breeze, and a maximum of pressure at each of the periods when a change takes place in the direction of the aerial currents; or, in other words, we find a decrease of pressure coincident with the increase of strength both of the land and sea-breezes, and an increase coincident with their decline in strength.

The facts thus stated appear to me to admit of the following explanation:—The diminution of pressure which precedes the minimum at 4h is occasioned by the rarefraction and ascent of the column during the heat of the day, and its consequent overflow in the higher regions of the atmosphere, which is but partially counter-balanced by the influx of the sea-breeze at the lower part of the column. Shortly after the hottest hour is passed, the overflow above and the supply below become equal in amount, and the diminution of pressure ceases. As the temperature falls towards evening, the column progressively contracts; when the influx from the sea-breeze more than counterbalances the overflow, and the pressure again increases, until a temporary equilibrium is restored, when the sea-breeze ceases, and the pressure is stationary. As the night advances, the air over the land becomes colder than over the sea; the length of the column over the land contracts, and the air in its lower part becomes denser than in that over the sea; an interchange then commences between them of an opposite character to that which prevailed during the day. The outward flow is now from the *lower* part of the column, or from the land towards the sea, causing the pressure to diminish over the land; it continues until day-break, when the strength of the land-breeze is greatest, because the air over the land is then coldest in comparison with that over the sea. As the sun gains in latitude, and the temperature of the day advances, the land heats rapidly, the density of the air over the land and sea returns towards an equality, the land-breeze declines in strength, and the drain from the lower part of the column ceases to counterbalance the overflow which the land-column is at the same time receiving in the higher regions; the pressure consequently having attained a second minimum at or near the hour of the greatest disproportion of temperature, again increases until the temperature and height of the column over the sea and land are the same, and the pressure again becomes stationary. But now the rarefraction of the column over the land continuing its increase in height above the less heated column with which it is in juxtaposition, and

its consequent overflow, occasion the pressure to decrease until the minimum at four o'clock.

We have thus, therefore, at Bombay, a double progression of the diurnal variation of the gaseous pressure; the principal minimum occurring at four o'clock in the afternoon, occasioned by an overflow from the column in the higher regions of the atmosphere; and the second minimum occurring at 18^h, occasioned by an efflux from the lower part of the column: the first minimum is similar to that which has been shewn to take place at Toronto, Prague, and Greenwich, and similarly explained; the second minimum, which does not take place at the three above-named stations, is owing to the juxtaposition of the columns of air over the sea and land, which differ in temperature, and therefore in density and height, in consequence of their resting respectively on surfaces which are differently affected by heat.

The mean range of the diurnal variation of the temperature in the clear season is 7.8°, and in the clouded season 3·7°; of the gaseous pressure 0 196^{in}. in the clear, and 0·082^{in}. in the clouded, season; the mean diurnal range both of temperature and of pressure in the clear season is therefore more than twice as great in the clouded season, affording a further illustration of the connexion subsisting between the variations of temperature and of pressure.

It does not appear necessary to dwell on the dependence of the diurnal variation in the elastic force of the vapour on that of the temperature. The dependence is an obvious one, and the facts are correspondent.

If, then, the explanation which I have offered to the section of the physical causes which produce the diurnal variation of the gaseous pressure at Bombay be correct, the diurnal variation of the Barometric pressure is also explained, since it is simply the combination of the two elastic forces of the air and of the vapour.

The solution of the problem of the diurnal variation of the barometer is therefore obtained by the resolution of the barometric pressure into its constituent pressures of vapour and air, since the physical cause of the diurnal variation of its component pressures have been respectively traced to the variations of temperature produced in the twenty-four hours by the earth's revolution on its axis, and to the different properties possessed by the material bodies at the surface of the globe in respect to the reception, conveyance, and radiation of heat.

Annual variation.—If we now proceed to the annual variations, which are shewn in the subjoined table, we perceive that the leading features of the

phenomena are clearly analogous to those which have been shewn to present themselves at Toronto, Prague, and Greenwich; viz. a correspondence of the maximum of vapour-pressure and a minimum of gaseous pressure with the maximum of temperature; and of the minimum of vapour-pressure and maximum of gaseous pressure with the minimum of temperature; and a progressive march of the three variations from the minimum to the maximum, and back to the minimum again. The epochs, or turning points, of the respective phenomena are not in every case strictly identical; but their connexion, which is the subject immediately before us, is most obvious.

We have thus a further illustration of the universality of the principle of the dependence of the regular periodical variations, annual as well as diurnal, of the pressure of the dry air and of the vapour on those of the temperature.

1843.	Temperature.	Vapour Pressure.	Gaseous Pressure.	Barometer.	Humidity.	Monthly Means greater (+) or less (—) than the Annual Means. Temperature.	Vapour Pressure.	Gaseous Pressure.
	Deg.	Deg.	Inch.	Inch.		Deg.	Inch.	Inch.
January	76·4*	0·578*	29·352	29·930	67	—4·7	—0·202	+0·329
February	77·7	0·648	29·246	29·894	71	—3·4	—0·132	+0·223
March	79·7	0·710	29·128	29·838	74	—1·4	—0·070	+0·105
April	84·2	0·853	28·961	29·814	76	+3·1	+0·073	—0·062
May	85·9†	0·921	28·743	29·664	78	+4·8	+0·141	—0·280
June	85·4	0·935†	28·718*	29·653	80	+4·3	+0·155	—0·305
July	82·1	0·896	28·737	29·633*	85	+1·0	+0·116	—0·286
August	81·2	0·859	28·869	29·728	84	+0·1	+0·079	—0·154
September	81·1	0·859	28·920	29·779	84	0·0	+0·079	—0·103
October	82·2	0·819	29·026	29·845	78	+1·1	+0·039	+0·033
November	80·5	0·675	29·213	29·888	67	—0·6	—0·105	+0·190
December	76·6	0·592	29.368†	29·960†	67	—4·5	—0·188	+0·345
Mean....	81.1	0.780	29.023	29·803	76			

The humidity exhibits also a single progression; but may, perhaps, be rather characterized as evidencing a very dry season from November to February, and a very humid one from June to September, the latter season being that of the rains.

The average degree of humidity in the year is very slightly lower than either at Toronto or at Greenwich, but is still closely approaching to a value expressing the pressure of three-fourths of the quantity of vapour required for saturation.

The mean gaseous pressure in 1843, derived from the two-hourly ob-

* Signifies 'minimum.' † Signifies 'maximum.'

servations, appears to have been 29·02+30·025 (an index correction which Dr. Buist gives as that of the barometer with which the observations were made)=29·048 English inches. The height above the sea is thirty-five feet, and the latitude 19° N.

The mean height of the barometer in the year 1843, derived from observations at every second hour, appears to have been 29·803; the elevation being thirty-five feet above the sea. This is less than what is generally received as the average height of the barometer in the same latitude. From the careful comparison described in Dr. Buist's report as having been made of the standard barometer with several other barometers, there seems great reason to believe that the mean height shewn by it must be a near approximation to the true mean atmospheric pressure in the year 1843 at Bombay.

The mean height of the barometer in the four clouded months of May, June, July, and August, is 29·667; and in the four clear months of November, December, January, and February, 29·921. The mean vapour-pressure in the same seasons is respectively 0·904 and 0·622, and the gaseous pressure consequently 28·760 and 29·298. There is, therefore, a difference of 0·535 of gaseous pressure in these two seasons, and there is also a mean difference of temperature of 5.84° degrees. The lowest pressure corresponds to the highest temperature, and *vice versa:* if we may allow ourselves to make a rough proportion drawn in a single case, we may estimate a decrement of 0·1 inch of pressure to an increment of 1 Fahren-heit. The highest temperature and lowest pressure is accompanied for nearly the whole of its period by the S. W. monsoon, or a wind blowing from the sea. The lowest temperature and the highest pressure is accompanied by the N. E. monsoon, or a wind from the land. The difference of the gaseous pressure in the two seasons is partially marked in the barometer by an opposite difference in the tension of the vapour, so that the barometric difference between the two seasons, though still distinctly manifest, is less than the difference of gaseous pressure.

The analogy of the annual and diurnal variations, considered in respect to the explanation which has been attempted of the latter, is too obvious to be dwelt upon. The decreased gaseous pressure in the hot season is occasioned by the rarefaction of the air over the land whilst the sun is in the northern signs, and its consequent overflow in the higher regions, producing a return-current in the lower strata; and the increased pressure in the cold season is occasioned by the cooling and condensation of the air whilst the sun is on the south side of the equinoctial, and its consequent reception of the overflow in the upper strata from the regions

which are then more powerfully warmed, and which is but partially counteracted by the opposite current in the lower strata.

In concluding this communication, I beg respectfully to submit to the consideration of the eminent meteorologists here present, that it is very important towards the progress of this science, that the propriety (in such discussions as the present) of separating the effect of the two elastic forces which unite in forming the barometric pressure should be either admitted or rejected. The very remarkable fact recently brought to our notice by Sir James Ross, as one of the results of his memorable voyage, that the mean height of the barometer is nearly an inch less in the latitude of 75° S. than in the tropics, presses the consideration of this point upon our notice; for it is either explained by the diminution of the vapour constituent in the higher latitudes, which diminution appears very nearly to correspond to the decrease of barometric pressure observed by Sir James Ross, or it is a fact unexplained, and I believe hitherto unattempted to be explained, on any other hypothesis, of so startling a character as to call for immediate attention.

Second Supplement to the Catalogue of the Birds of Southern India, by T. C. Jerdon, Esq.

Madras Medical Establishment.

A considerable addition to the Ornithological Fauna of Southern India, and a few important corrections form the present article. Those species which are introduced here for the first time as inhabitants of the Peninsula, are marked with an asterisk.

* No. 1. bis—*Vultur Indicus,* Scopoli and Latham—not of Sykes', nor of Jerdon's Catalogue—*V. tenuirostris,* Hodgson.

This large species has been hitherto overlooked by me. Mr. Blyth appears to think that *V. Indicus* Temm. is a synonym of *V. fulvus,* to which he now refers my *V. Indicus,* and that *V. Imperialis* T. is a synonym of the present bird. From the dimensions however assigned to *V. Imperialis,* viz. 40 inches (French measure) I am inclined to believe that Temminck's *Indicus* refers to the same bird as that of Scopoli

and Latham, and that *Imperialis* is either a synonym of *fulvus*, or a new species to which Sykes' and my bird must be referred.

Cat. No. 6.—*Pandion lineatus* is the young state of *Haliœtus Macei.*

Cat. No. 9.—*Aquila chrysaetos* turns out to be *A. imperialis*—identified as such by Sir W. Jardine, to whom I sent a specimen.

No. 10. Cat.—*A. bifasciata*—a distinct species abounding towards Arracan, and the N. E. portion of Bengal.

No. 11. Cat.—*A. Vindhiana*—Some time ago I suggested the probability that this was the European *A. nœvia*, and Mr. Blyth has ascertained that it is so.

No. 12. Cat.—*Nisaetus niveus*—This is not the *niveus*, but the *N. grandis* of Hodgson, now considered to be identical with *Aquila Bonelli* of Europe.

12 ter, Sup. Cat.—The Neilgherry Black Eagle was described by Hodgson in the Journal of Asiatic Society as *A. pernigra*, and when I described it I had not then access to the volume containing this account. Some time afterwards I sent specimens to the Asiatic Society of Calcutta under the generic name *Ictinaetus*, intending to have given its character at an early opportunity. Mr. Hodgson however had again forestalled me, having sent a paper to the Asiatic Society in which he proposed the name of *Heteropus*. But as this name has been previously (twice indeed) employed in Zoology, perhaps Mr. Hodgson will adopt the name here suggested. Mr. Gray in his list of Raptores in the British Museum makes this fine eagle synonymous with *Falco Malaiensis*, Reinwardt, *Aquila Malayana*, Cuvier.

* 15 bis—*Baza lophotes, Falco lophotes*, T. *Baza Syama*, Hodgs., *Lophotes Indicus*, Lesson and Swainson.

I shot a single specimen of this curious bird in a grove at Davroypilly in the Nellore district, near the range of Eastern ghauts. It is rather an unexpected addition to the Fauna of Southern India, though not very uncommon in Bengal.

No. 16. Cat.—The common Kite of India is now supposed to be the European *Milvus ater*.

Cat. No. 20.—This small eagle is now considered to be the European *Aquila Pennata*.

No. 20. bis.—Suppl. Cat.—My *Spizaetus punctatus* is considered by Mr. Blyth to be the young of S. *hastatus*, Lesson, and is an aberrant species of *Aquila*.

No. 21. ter.—Suppl. Cat.—This is, as I suspected, the *Buteo albidus* of French authors, and I have identified it as the young state of *Hæmatornis undulatus* of Vigors.

No. 23. Cat.—Common Indian Harrier. This is the *Circus Swainsonii* of A. Smith, found both in Africa, and the East of Europe, as well as in India.

No. 29. Cat.—My *Falco Shaheen* has been previously named, it appears, by Sundevall, a Swedish Naturalist, as *Falco peregrinator*—F. *Aldrovandi* T. is a very distinct, much smaller, species.

* No. 30. bis.—*Falco vespertinus.*—I shot a single specimen of the Red-legged Falcon of Europe on the Neilgherries in January, 1840, and have seen another killed at Nellore. Mr. Blyth has also obtained it at Calcutta, and it is not very uncommon on the Himalayas.

No. 32. Cat.—The prior name for the Shikra is *Accipiter badius.*—It is also *F. Dussumierii* T.

No. 34. Cat.—*Accipiter besra.*—The bird described at No. 35 is an adult *Besra*—it is most probably the *A. Dussumierii*

of Sykes' Cat.—Mr. Strickland writes me that he considers it to be the young state of *A. virgatus* of Temminck, but I am convinced that this is a mistake.

No. 38. Cat.—*Strix longimembris* is probably the *S. candida*, of Tickell.

No. 40. Cat.—Is the *Noctua hirsuta*, Tem., and *Ninox nepalensis* of Hodgson.

* No. 41. bis.—*Urrua cinerea* Blyth—perhaps *Scops coromandus* of the older authors. I have procured specimens of this fine owl near Nellore.

No. 42. bis—Sup. Cat.—*Bulaca monticola*—This is the *B. newarensis* of Hodgson.

No. 43. Cat.—*Scops Javanicus.*

From information received by me lately from Mr. Blyth it appears probable that the Scops Owl of Malabar and the West Coast may yet prove distinct from the Malayan *S. lempigi,* though it is certainly very closely allied. Should it prove so, I would propose the name of *malabaricus.*

* 43 bis—*Scops pennata*—Hodgson. The first specimen I saw of this pretty little owl was one found dead close to a house I then occupied in Madras. Mr. Ward afterwards sent me a specimen from the West Coast, and I have since obtained it from the forests of the Eastern Ghauts. It varies remarkably in its plumage, one state being so extremely similar to the *Scops sunia* of Hodgson, that I at one time considered it identical. Mr. Blyth however informs me that he considers them distinct.

Dimensions.—Length about $7\frac{1}{2}$ inches, wing $5\frac{3}{10}$, Tail $2\frac{4}{10}$, Tarsus $\frac{9}{10}$ths.

* 43 ter—*Scops griseus*—new species? *S. lettia*, Hodgson, var.

I have procured several specimens of a rather large Scops Owl from the forests of the Eastern Ghauts, which very closely resembles that named *lettia* by Hodgson, but which is smaller and differs otherwise according to Mr. Blyth. I add a brief description. General tone of plumage, light cinereous grey, more or less tinted in parts with fulvous, and mottled, marbled, and streaked with various shades of brown—under plumage very light—the feathers centred dark—feathers of the tarsus creamy white. The Malabar Scops Owl, which nearly approaches it in size, differs in the prevalence of a strong rufous tinge, more especially in the plumage beneath. I have now seen many specimens from the Eastern Ghauts, none of which have any tendency to that marked rufous hue.

Length 10 inches, wing about 6, Tail 3.

No. 46. Cat.—The *Noctua cuculoides* of my Catalogue is quite distinct from the Himalayan bird, and is the *Noctua radiata* (Tickell,) *N. perlineata,* Hodgson.

* No. 46. bis—*N. spadicea* (T), *S. castanoptera,* Horsf.

The Southern provinces of India and Ceylon appear to possess a distinct species which from its prevalent rufous hue appears to be the species mentioned above. I have procured it from Travancore and the southern provinces of Malabar, and Mr. Blyth has seen specimens from Ceylon.

*No. 51. bis.—*Lanius cristatus* L., after Edw, pl. 54.—*L. melanotis* Val.—*L. ferrugiceps,* Hodgson. I had overlooked this Shrike as the young of *L. Hardwickii,* but Mr. Blyth pointed out to me that it was quite distinct, and identified it as above. Common throughout the peninsula, frequenting low jungle, gardens, and hedgerows. It is also *L. phœnicurus,* Pallas-apud Latham.—*L. superciliosus.* var. A., Lath.

No. 54.—The common Indian Swallow Shrike is the *Ocypterus rufiventer* of authors.

No. 55.—It appears that the common King Crow of India will stand as *Dicrurus macrocercus,* Vieillot.—It is also *D. Indicus* Stephens, and *D. albirictus* Hodgson, &c.

No. 57.—If the name *Macrocercus* be rightly applied as above, then my bird will require a new name, and Lord Arthur Hay has, in a Monograph of the *Dicruridæ,* given it the title of *longicaudatus.*

*No. 59. bis.—I have lately procured several specimens of a racket-tailed Drongo from the jungles of the Eastern Ghauts, which appear to differ decidedly from the Malabar bird. As Lord Arthur Hay has been engaged in examining this family I gave specimens to him, and he distinguishes this species by the name of *Edolius dentirostris.*

*No. 59. ter.—*Edolius orissæ.*—Specimens of the racket-tailed Drongo, procured by Lord Arthur Hay from the jungles of Goomsoor, appear also to differ specifically from the other known species, and that gentleman has applied the above name to this one.

For ample details respecting the differences of these and the other species, vide the Monograph of this family by Lord Arthur Hay, in the present* number of this Journal.

*No. 58. bis.—*Dicrurus criniger* (T.), *Corvus hottentotus* L., —*Ed. Chrishna,* Gould. *Chibia casiá,* Hodgson. *Criniger splendidus,* Tickell. *Hair-crested Drongo.*

Captain Roberts of the 36th M. N. I. obtained this handsome species in Coorg many years ago, a fact which he communicated to the then Editor of this Journal, some time after the publication of my Catalogue. Lieut. Blake of the same Regiment also informed me that he had shot it in that locality. I have quite recently obtained a specimen from the Eastern Ghauts. It must however be very rare in Southern

* The departure of this gentleman for Calcutta has delayed the appearance of this article.

India, as I have never seen a specimen among the numerous collections from the West Coast which I have examined. It appears to be not uncommon about Calcutta.

No. 60.—*Ceblepyris papuensis*—It appears doubtful if this be the true *papuensis*—if not, it is perhaps the *Graucalus Macei* of Lesson.

No. 61.—My bird turning out to be distinct from *Ceblepyris fimbriatus,* will stand as *C. Sykesii,* Strickland.

*No. 61. bis.—The *Ceblepyris melaschistos* (Hodgson), *Lanius silens* Tickell, has been obtained from Goomsoor.*

*No. 65. bis.—*Phœnicornis roseus. Muscicapa rosea* V. *Phœnic. rubritinctus,* Blyth. I had overlooked this bird as the young of *P. flammeus,* till Mr. Blyth pointed out its peculiarities. It is found in the forests of the West Coast, though but sparingly, and appears more common about Calcutta.

*No. 69. bis.—*Brachypus xantholæmus*—new species—Yellow throated Bulbul—*Konda Poda pigli* Tel—i. e. Hill bush Bulbul.

I have recently obtained specimens of this well marked species of *Brachypus* (hodie *Pycnonotus*) from the denser portions of the forests of the Eastern Ghauts, to which it at present appears confined, as I have not seen specimens from any other part of the country. Description—Head, face and neck, yellowish green, chin and throat pure yellow—upper plumage gray with a slight tinge of green here and there, most marked on the upper tail coverts; wings dusky, edged with yellow green, which gives that tinge to the whole wing when closed—Tail dusky, the feathers edged with yellow green, and except the centre ones tipped with white—breast gray, paling to whitish on the lower part of the abdomen : under tail coverts pure yellow. Bill and legs black—length

* Since writing the above, Mr. Blyth informs me that Mr. Strickland considers this bird to be the true *C. fimbriatus* of Temminck.

about 8 inches—wing $3\frac{6}{10}$—tail $3\frac{6}{10}$—bill at front $\frac{6}{10}$—tarsus $\frac{8}{10}$ths—Irides said to be red—(I have not as yet seen fresh specimens myself.)

No. 69.—It is possible that this bird may be the *Brachypus gularis* of Gould, P. Z. S. 1835, from Travancore, as it agrees with the description except as to the throat, the color of which however may have been accidentally omitted, as the specific name is derived therefrom.

No. 71.—This must be the *Chloropsis malabaricus* auct, the true *aurifrons* not being found in the peninsula.

No. 72.—Mr. Blyth considering that the specimens I had sent him of this *Chloropsis* did not agree exactly with the description of *Cochinsinensis,* proposed the specific name of *Jerdoni.* Mr. Strickland however appears to think that I had rightly identified it. On a minute examination of the descriptions in Latham, and other authors, I am by no means certified of the correctness of this application, and as notwithstanding the labours of Sir W. Jardine and other naturalists, considerable confusion appears to exist among the species of the interesting group, I shall here add the result of my investigations.

1. *Chloropsis aurifrons—C. malabaricus,* apud Jard. and Selby—s. pl. 5, Ill. Orn., afterwards corrected in Synopsis of species in the 2d vol. s. pl. 100—*Hurruwa Bee Eater,* Lath, but not var. A., which appears to be the next species—*Phyllornis aurifrons* T. P. C. 484. 1—not *C. aurifrons* apud Jerdon, Catal. Not found in Southern India.

2. *Chl. malabaricus* (Lath)—*yellow fronted Thrush*—do. No. 50—*Hurruwa Bee Eater, var. A.,* not *malabaricus* of Jardine and Selby, Synopsis, nor of Blyth J. A. S., nor of Eyton P. Z. S.—*C. aurifrons* apud Jerdon, Cat. No. 71—*C. cæsmarhynchos* (misprint for *gampsorhynchos*) apud Tickell and Blyth J. A. S.

This species is I think clearly enough intended by Latham.—The name yellow fronted Thrush is only applicable to *aurifrons,* and the present species, and the fact of Sir W. Jardine having formerly applied this name to the *aurifrons,* shows how nearly allied the species are—Latham however recognised the distinctions, though he has, like later authorities (whom perhaps he has been the means of misleading) mixed up and confounded it with our next species,—whose female he describes (though imperfectly) as the female of *malabaricus.* Moreover under his black chinned honey eater, *Turdus cochinsinensis* of the Ind. Orn., as var. A., he describes well enough the female of our next species, giving also as synonyms his *Turdus malabaricus.*—As however he has accurately enough described our present bird under *malabaricus,* I have no hesitation in thus applying that name. I have no access to Sonnerat's description of his 'Petit Merle de la cote de Malabar' which Latham gives as a synonym, and indeed from which I imagine Latham drew his account. Its chief habitat is certainly the forests of the Malabar coasts, extending though sparingly, and only in suitable localities, into central India.

It is very rare in the jungles of the Eastern Ghauts, whilst the next bird is abundant.

3. *C. Jerdoni* Blyth—*C. cochinsinensis* apud Jerdon, Cat. No. 72—not the *cochinsinensis* of Latham—*C. Malabaricus* apud Jardine and Selby—not of Temminck P. C. 512.2, nor apud Blyth J. A. S. p. 957.—Female described by Latham as fem. of his *Turdus Malabaricus,* and as var A., of his black chinned honey eater, *Turdus cochinsinensis.* Although the description by Latham of his *Turdus cochinsinensis* agrees somewhat with our present subject, yet from various discrepancies, from the locality, and still more from an inspection of the figure in the P. E. 643.3, from which apparently this description was taken, I am inclined to believe that this, the *chloropsis* of Southern India, is perfectly distinct from the

cochinsinensis of Latham, the Verdin de la cochinchine of Buffon, and that Mr. Blyth's name will stand good. It is dispersed over all the southern part of India, but I have as yet seen no specimens from any of the Malay countries, nor has Mr. Blyth procured it elsewhere.

4. *C. Cochinsinensis* [Lath.] Jardine and Selby, and others, *C. Malabaricus* apud Blyth, J. A. S., and Eyton, P. Z. S.—*Phyllornis Malabaricus* Temm. P. C.—*C. mystacalis* Sw.?? I have not seen this except it be identical with Swainson's *C. mystacalis*, a specimen of each sex of which, from Lord Arthur Hay's collection, is now before me. The male of *mystacalis* has however no trace of the azure patch at the bend of the wing, nor of any blue on the wings and tail, nor is the head yellowish. The female however corresponds with Mr. Blyth's description of his female *Malabaricus*. Nevertheless I shall consider them for the present distinct, till I have had an opportunity of examining other specimens. Hab. Malay countries.

5. *C. Sonneratii*, *Phyll. Mullerii* T., *Chl. Zosterops*. Jard. and Selby is fem. *Turdus viridis* Horsf. *C. gampsorhynchos* J. and S., young male. Mr. Blyth says, I know not on what authority, inhabits Southern India, and the Malay countries. I have never seen it nor heard of its having been found in Southern India.

6. *C. Hardwickii* J. and S., *C. curvirostris* Sw., *C. chrysogaster.*, M. and H., *C. auriventris*, Delessert—*C. cyanopterus*, Hodgs. Hab. Nepal, Assam, &c.

I was at one time inclined to think that the figure in the P. E. 643.3 was taken from an immature male of this species.

7. *C. mystacalis*, Sw., if distinct from No. 4.*

* It is distinct, but is identified by Mr. Blyth with the next species.

8. *C. cyanopogon* T., if distinct from the last. The chief difference is that the black is described as occupying only the chin, whilst in *mystacalis* it occupies both chin and throat.—The *Meliphaga Javanica* of Horsfield is sometimes given as a synonym of *C. cochinsinensis*, but I believe of late it has been considered identical with *Turdus viridis*, and both referred to *C. Sonneratii.*

No. 73.—It appears that there are 3 species at least of *Jora.* Our southern species is *I. zeylanica, meliceps,* Horsf., quite distinct from *typhia* of Bengal, which again differs from *scapularis* of Malayana.

No. 74.—*Pycnonotus flavirictus* Strickl. It appears that this cannot be the *virescens* of Temminck, and some time ago I told Mr. Blyth that I intended giving this bird the specific appellation of *dumeticolus,* a name at once expressive of its habits, and a translation of its Teloogoo name, which signifies *Bush Bulbul,* but in the mean time Mr. Strickland had met with it in London, and given it the excellent name mentioned above.

No. 75. Cat.—Mr. Strickland considering this bird distinct from the *Turdus indicus* of older authors, has named it *Criniger* (the modern name for Trichophorus) *ictericus.*

No. 76. Cat.—The common Bulbul of the South of India is the *muscicapa hæmorrhousa* of the old authors, which specific name will accordingly hold good.—It is very distinct from the *B. cafer* of Bengal, and Mr. Blyth on comparing them first called this species *pusillus.*—That gentleman has informed me of the present bird being found in Arracan, which shows a truly remarkable geographical distribution.

No. 78.—Mr. Blyth refers this bird to his new genus *Alcippe,* vide J. A. S.

No. 80.—*Pitta brachyura*—This bird will now stand as *P. superciliaris,* Wagler.

* No. 83. bis.—*Turdus nigropileus* La-fresnaye—This bird is nearly allied to, though quite distinct from, the Neilgherry black-bird—I have found it, though very rare, and only an occasional visitant, to various parts of the country, but it appears most abundant in the Malabar forest. I have obtained it myself both at Jalnah, and at Nellore, in gardens, and found it feeding on a species of helix.

Length—$9\frac{1}{2}$—W 5—T $3\frac{3}{10}$ Tars—$1\frac{3}{10}$—bill (front) $\frac{9}{10}$ths.

No. 85.—This species of Thrush is now considered to be the *Turdus whitei,* but Mr. Strickland has identified it as the *T. duama* of Latham, which name will accordingly hold good.

* No. 84. bis.—*Turdus Wardii*—Jerdon, Illust. Ind. Ornith. pl. viii.

Since my account of this peculiarly marked Thrush in my Illustrations of Indian Ornithology, I have met with it at Nellore. Lord Arthur Hay also obtained a specimen at the foot of the Neilgherries. Mr. Blyth informs me that Mr. Hodgson had also sent it to the Calcutta museum under the MSS. name of *T. micropus.*—I think it is probably the *Darunga* Thrush of Latham, No. 32.

No. 86.—This species is now generally considered to be the *Pellorneum ruficeps* of Swainson. Mr. Blyth considers it to be identical with the *Cinclidia punctata* of Gould, and the *Hemipteron nepalense* of Hodgson. Mr. Strickland has also identified it with Sykes' *Megalurus ruficeps.*

No. 91.—In my Illustrations of Indian Ornithology, I have separated the species found in the Malabar forests from Col. Sykes' *Somervillei,* under the name of *Malabaricus.*

* No. 91. bis—*Malacocircus orientalis,* new species. In the same place I have pointed out what I consider to be a new species from the jungles of the Eastern Coast of India, and given it the above name.

* No. 91. ter.—Should Sykes' species *T. Somervillei* really prove distinct from my *Malabaricus,* it will form another addition to my catalogue.

* No. 92. bis.—*Malacocircus affinis,* new species.

The peculiarities of this species and its distinction from the common *M. griseus* of the Carnatic I have also pointed out in my article on *M. griseus,* pl. xix. of my Illustrations. It is from Travancore.

No. 97.—*Oriolus kundoo* Sykes.

No. 99.—I have named and figured the peninsular representative of *O. chinensis* in my Illustrations, pl. xv., with the title of *O. Indicus.*

No. 106.—Mr. Blyth identifies Sykes' *Saxicola rubeculoides,* as the *Muscicapa leucura* of Latham and Swainson.

No. 113.—This bird has been identified by Blyth as the *Turdus arundinaceus* of Linnæus, the *Sylvia turdoides* of Temminck, and it belongs to the genus *Acrocephalus.*

No. 88. bis—Suppl. Cat.—The doubtfully cited *Megalurus,* to which I gave the specific name of *striatus,* was obtained by Mr. Blyth at Calcutta, who rightly referred it to its proper genus *Dasyornis,* and called it *locustelloides.* The name *Sphenura* taking priority of *Dasyornis,* the bird will now stand as *Sphenura striata.*

No. 96. bis.—Suppl.—An allied species which I named in the first Supplement to my Catalogue, *Thimalia platyura,*

was at first referred by Mr. Blyth to the same group as the last, but he has since proposed for it a new genus, *Schœnicola*.

*No. 113 bis.—*Phragamaticola olivacea,* Blyth, new species.

I procured at Nellore among some high reeds a species so similar in size and colouring to *Acrocephalus arundinaceus,* that without further examination I referred it to that species, and it was only on looking over my specimens of that bird, that I recognised its peculiarities. I forwarded it to Mr. Blyth, being myself doubtful where to locate it, and that gentleman has made of it a new genus to which he has given the above name, and will shortly fully describe its peculiarities. It is somewhat allied to *Sphenura,* especially in its habits, but differs in its wider and more depressed bill, and varies in other points. Its plumage, as I have before mentioned, is almost identical with that of the European Reed Thrush.

Length 7½ to 8 inches, W. 3, T. 3½, Tars. 1¼, Bill (front) $\frac{6}{10}$ths.

No. 95 bis.—Suppl. Cat.—Mr. Blyth first referred my *Thimalia poioicephala* to his genus *Trichastoma,* which has since been identified by Strickland with *Malacopteron* of Eyton, but he has since, I believe, referred it to his new genus *Alcippe*.

No. 109 bis.—Suppl. Cat.—*Phœnicura major.*—I am now inclined to class this bird as a *Calliope,* but Mr. Blyth proposes for it a new genus which he will shortly define.

No. 109 ter.—My *Phœnicura superciliaris* was previously named by Hodgson *Larvivora cyanea.* Mr. Blyth agrees with me in considering that it comes under *Calliope,* and it will now therefore stand as *Calliope cyanea.*

No. 115.—*Orthotomus lingoo,* Sykes', is to be cancelled, being only the young of *O. Bennettii,* as has been ascertained by Strickland from Col. Sykes' own specimens.

No. 117—*Prinia gracilis.*—This name has been changed

by Mr. Blyth to *P. Hodgsonii,* the name being forestalled for a species from northern Africa delineated by Rüppell.

No. 119—*P. macroura* of Franklin has been called *Franklinii* by Blyth, that name being previously occupied. It is however perhaps the *Sylvia longicaudata* of Tickell.

No. 121—*P. rufifrons.*—This name, also forestalled by Rüppell, has been changed by Mr. Blyth to *P. Buchanani.*

* No. 121 bis.—*P. neglecta*—new species.—Some time ago I sent to Mr. Blyth a specimen of a species of *Prinia,* which I thought distinct, and which that gentleman named *P. Jerdoni,* but afterwards considered it merely as a variety of *P. inornata*. On examining carefully all the specimens of *Prinia* in my collection, I find one species decidedly distinct, and not being certain that it is the same as the one sent to Mr. Blyth, have here named it as new. I add a brief description.

Size nearly that of *Sylvatica*—Bill shorter, deeper. Plumage above similar to that of *Sylvatica,* viz. a greenish ashy brown, but with a decided tinge of rufous throughout; beneath whitish, strongly tinctured with fulvous—Tail very faintly barred.

Length about 6 inches, W. $2\frac{3}{10}$, T. $2\frac{1}{10}$, Tars. $\frac{9}{10}$, Bill (front) $\frac{4}{10}$ths.

I procured it from the jungle skirting the base of the Eastern Ghauts.

No. 123—*Sylvia montana.*—Mr. Strickland having examined specimens sent him by me, considers this bird to be the same as the European *S. (acrocephalus) arundinacea,* or the lesser reed bird. It is certainly migratory in the south of India. Col. Sykes' *montana* is identical with mine so called, but both are very distinct from Horsfield's *S. montana.*

No. 124—*S. rama,* Sykes.—This Mr. Blyth looks on as an aberrant species of *Phyllopneuste.*

124 bis.—*Sylvia (acrocephalus) agricola,* new species.

Descr.—Plumage above pale rufous brown—beneath whitish tinged with fulvous—Length about 5½ inches, W. $2\frac{3}{10}$, T. $2\frac{3}{10}$, Tars. $\frac{9}{10}$, Bill (front) $\frac{4}{10}$ths.

I found this species of warbler frequenting rice fields in the neighbourhood of Nellore during the cold weather. Mr. Blyth informs me that he has found it very abundant in reedy ground near Calcutta. It approaches somewhat the descriptions of *S. palustris* of Europe.

No. 125.—The *Sylvia trochilus* of my Catalogue has been named *Phylloscopus tristis* by Mr. Blyth, who has found it near Calcutta.

No. 126.—The doubtfully named *S. hippolais* of my Catalogue has been named *Phylloscopus lugubris* by Blyth.

No. 127.—This is probably the *M. affinis* of Tickell.

* No. 125 bis.—*Phyllopneuste occipitalis,* Blyth, new species. I sent a specimen to Mr. Blyth of a bird obtained by me at Nellore in the cold weather, very like the *P. reguloides* of that naturalist, but sufficiently distinct for him to characterize it as above.

* No. 126 bis.—*Phylloscopus nitidus*—Bl.—probably *Muscicapa nitida* of Latham and Franklin. I have also obtained this bird at Nellore.

* No. 127 bis.—*Phyllopneuste Indica,* Blyth, new species. I obtained a specimen of a warbler nearly allied, according to Mr. Blyth, to the *Sylvia hippolais* of Temminck, and which that gentleman will shortly describe under the above name. He obtained another specimen from Mr. Hodgson.

* No. 129 bis.—*Parus nuchalis,* new species—white naped Titmouse.

Descr.—A wide nuchal mark, streak from gape, cheeks, ears, sides of neck, of breast and abdomen, two external tail feathers on each side, outer barb of the next, and tip of the others, a bar on the primaries, and outer edge and tips of the

tertiaries, white—the rest of the body glossy black, except the under tail coverts, which are mixed black and white. Bill and legs black—Length about 5 inches, of wing $2\frac{6}{10}$, Tail 2, Tars. $\frac{7}{10}$, Bill (front) $\frac{4}{10}$ths.

I obtained this interesting addition to the Fauna of Southern India from the range of Eastern Ghauts.

No. 133—*Parisoma vireoides.*—I have for some time considered this curious bird to be the *Fringilla agilis* of Tickell, but have only lately procured another specimen to forward to Mr. Blyth, and who has formed of it a new genus, *Piprisoma,* and allies it to the Dicœum group, to the slender billed, sombre coloured species of which it bears much the same relation, that the genus *Prionochilus* of Strickland does to the slender billed, gaudy coloured species of Malaisia. The synonyms of this species are as follows: *Piprisoma agilis,* *Fringilla agilis* Tickell, *Pipra squalida,* Burton—*Parisoma vireoides,* Jerdon.

Nos. 135, 136, and 136 bis—probably all belong to the same bird, which must be referred, as I first pointed out, to *Motacilla viridis,* Auct, taken from Brown's Illustr. of Zoology. It is also (says Mr. Blyth) the *M. bistrigata* of Raffles.

No. 139.—The *Mot variegata* of Vieillot was named previously by Latham *M. Indica,* and Mr. Blyth has lately created a new genus for it by the name of *Nemoricola.*

No. 140.—The white wagtail of India is *Mot. luzoniensis,* Scopoli, since named *leucopsis* by Gould, and *alboides* by Hodgson.

* No. 144 bis.—The species which I mention under the name of *fuscoventris* as having been seen, but not obtained by me at the Neilgherries, proves to be a new species, which I have named *Leucocirca pectoralis.* Vide my Illustr. Ind. Ornith. pl. ii.

Nos. 146 and 147.—The red bird is only the immature one of the white—vide Illustr. Ind. Ornith. pl. vii.

* No. 150 bis.—*Muscicapa (Cyornis) Tickelliæ* Blyth—*M. hyacinthina* T. apud Tickell.

As it is probable that most of Tickell's species will be found within the limits of my district, I shall here include such of his birds as have been authenticated, and this among the number.

No. 154 bis.—Suppl. Cat.—*M. rubecula* Sw. Mr. Blyth suggests that this may probably be the female of the preceding bird.

No. 125.—Sykes' *M. picata* is distinct from the Malayan bird, with which I had confounded it, but it will bear the prior name of *tyrannides,* Tickell. The *M. variegata* Auct. is perhaps the female of this bird.

No. 156—*Musc. Erythropygia.*—This is probably a species of *Phœnicornis* (vel *Pericrocotus*) as suggested by Mr. Blyth. I find it described, and a figure of the male given by Latham, as the *Cawnpore Flycatcher,* No. 30 G. H.

No. 161.—The *Pica Sinensis* is a doubtful native of the Peninsula; I have never obtained it; and as the collection in which I saw it named as from the Eastern Ghauts, included specimens from other parts of the country, I shall in future exclude it from the Peninsular Fauna.

No. 166.—This bird described under the name of *Pastor Malabaricus* in my Catalogue being considered new, I gave a figure of it in my Illustrations under the name of *P. Blythii.*

* No. 166 bis.—*P. Malabaricus* verus.—The gray headed Myna alluded to in my account of the last bird, as a cold weather visitant to the peninsula, is now considered to be the real *Malabaricus.* It is abundant in Bengal.

No. 168.—The hill Myna of Southern India is quite distinct from that of Bengal, which again differs much from that of Malayana. Mr. Blyth who had only seen the two forms, considered the Bengal one as true *religiosa,* vel *Javanus* Cuv., and

the one from S. India as *Indica, (Eulabus Indicus Cuv.)* In Lord Arthur Hay's collection are specimens of each, and he names the Southern one *religiosa,* the Bengal one *Indica,* and the Malayan one *Javanus,* to avoid the inconvenience of a new name, but I imagine if any of the three species require a new name it will be that of Southern India, and I would suggest the name of *G. minor.*

No. 169.—It is probable that our common weaver bird differs from the *E. Philippensis,* and Mr. Blyth has suggested for it the name of *E. Baya.*

No. 170.—The Brahminee Baya, which I referred in my Catalogue to *E. Bengalensis,* being found distinct from that species, both of which are abundant in Bengal, gave it the name of *striatus;* but Mr. Strickland has ascertained that it is identical with the species named *Manyar* by Horsfield, whose name will therefore stand. It is also *E. flaviceps* of Swainson.

Nos. 172 and 173.—These two species will stand as *punctularia,* and *striata,* names which, I believe, I was the first to point out as prior appellations to those given by Temminck.

No. 175.—*S. cheet* (Sykes.)—This little Finch is undoubtedly the *Loxia Malabarica* of the older authors, as was pointed out by Mr. Blyth.

No. 177.—The name *flavicollis* was first given by Tickell, not by Franklin.

No. 178—*Pyrgita concolor.*—Mr. Blyth considers it possible that the *Emberiza olivacea* of Tickell may refer to this bird, which I have never again met with.

* No. 179 bis.—*Emberiza icterica* Eversm. apud Gray—*E. luteola,* Lath., apud Blyth—*E. guddak* Buch Ham.

This handsome species of Bunting, which I learn from Mr. Blyth has been figured by Gray, is, I find on reference to Mr.

Elliot's notes, the species named *Gundum* by him, which I had confounded with the *E. melanocephala,* so abundant in the north of the Deccan, and there called *Gundum.* I have procured this bird from the Cuddapah district during the cold weather, and Mr. Blyth has obtained it from Central India. Mr. Elliot too found it abundant in Dharwar; but it appears to be very locally distributed, for I never myself obtained, or saw it, that I am aware of, among the thousands of *E. melanocephala* that yearly visit the corn fields about Jaulnah.

No. 180—*E. ortolana* Sykes' Cat.—I have not myself obtained this as yet, nor has Mr. Blyth, but he has seen a drawing of Buchanan's of an allied species, which he has named *E. Buchanani.*

No. 181—*E. cia.*—The doubtfully cited *cia* of my Catalogue is referred to *Emberiza fucata* Pallas, *E. lesbia* of Temminck; not of other authors.

Nos. 182 and 183—*E. cristata,* and *E. subcristata.*—These are but male and female of the same bird, which is now named *E. (Melophus) Lathami* Gray. It is also the *E. nipalensis* of Hodgson, and the *E. erythroptera* of Jardine and Selby. The bird named by Buffon, Le Moineau de Macao, figured Pl. Enl. 224, 1, appears to me to be the same bird, and if so it will bear the prior, but certainly inappropriate, name of *melanictera* Vieillot.

No. 185—*Alauda Chendoola.*—The Aggun of South India referred by me from a living specimen to Franklin's *chendoola,* is, I find on procuring specimens, a species of *Mirafra,* which I have called *cantillans,* under which name Mr. Blyth has described it in the Journal of the Asiatic Society, vol. 13, p. 960. It appears very locally distributed, but Mr. Blyth has obtained it near Calcutta.

No. 186—*Alauda deva*—Sykes.—The *Chandool* of South-

ern India. This bird very closely approaches the *Certhilauda chandoola* (Franklin) of Northern India, and I think should range with it in Certhilauda, though neither of them are typical species. Mr. Blyth considers it as possibly the *Al malabarica* of the older authors, but Mr. Strickland writes me, that he thinks this name applies to a species of *Mirafra* I sent home, and which I had called *M. affinis*.

No. 187.—This social lark, or Ortolan as it is usually called, has been placed as the type of a new genus by Mr. Blyth, and it will now bear the name of *Coryphidea baghaira.*

No. 189.—The *Mirafra Javanica,* of my catalogue, I have now reason to consider distinct, and have named it *M. Erythroptera.* It is described by Mr. Blyth in the Journal of the Asiatic Society, vol. 13, p. 958, and a figure of it will shortly appear in my Illustrations.

* No. 189 bis.—*Mirafra malabarica, M. affinis*—Jerdon—Blyth l. c.—This allied species is found spread over a large extent of country. I have seen specimens from Goomsoor. It is abundant in all the Carnatic, and also in Malabar, and in portions of the Table land. It is not found in the neighbourhood of Jaulnah. It abounds in every compound in Madras.

* No. 188 bis.—*Mirafra Hayii*—new species.—The first specimen I saw of this crested *Mirafra* was in the possession of Lord Arthur Hay, after whom I have named it—I have since procured it from Malabar, and from the Eastern Ghauts—vide Blyth's paper l. c.—for comparative descriptions of all these.

No. 190 *Anthus agilis.*—Mr. Strickland writes me that specimens I sent have, with this name, differed from Sykes' *agilis.* It appears to be the same as Eyton's *Anthus Malaayensis.*

* No. 190 bis.—*Anthus striolatus* Blyth.

I have procured several specimens of this Titlark in the neighbourhood of Nellore. Mr. Blyth obtained his specimen from Darjeeling.

No. 193 bis.—This species must be cancelled, it being identical with my *Pellorneum*, No. 86, as previously indicated.

No. 195.—This is now the *Erythrospiza erythrina* (Pall.), the name *rosea* of Vieillot being preoccupied, and L. Bonaparte's generic name being prior to *Hœmorrhous* of Swainson.

No. 197.—This the common Hornbill of Malabar must stand as *Buceros pica*, Scopoli,—whose names precede those of Latham. It is distinct from the Bengal bird, *B. albirostris*.

No. 198.—This species will stand now as *Buceros birostris* Scop.

* No. 205 bis.—*P. ceylonus* Forst. *P. neglectas*, Wagler.

Lord Arthur Hay brought from Ceylon a single specimen of this Woodpecker, which, it is highly probable, will be yet found in the southernmost portions of the peninsula.

No. 206—*P. (Hemicercus) cordatus.*—Mr. Blyth appears to think that the *Picus Canente* of Lesson is identical with my bird. A figure will appear in my Illustrations No. 3. Mr. Blyth has obtained it from Arracan.

No. 208—*P. Elliotti.*—Some time ago a pair, male and female, of a fine Woodpecker were sent to me by Lord Arthur Hay, which had been identified by Mr. Elliot, as the one described by me from his notes. The male has the crest fine red—but the description of the female was accurate enough when the punctuation is corrected; for it should be read "Cheeks black; spot from the eye," &c.—on seeing these birds I at once recognised a Woodpecker described by Mr. Blyth as *P. (Chrysocolaptes) melanotus*. On my arrival at Madras and comparing the descriptions of Latham and Shaw, together with the figure in Shaw copied from the Pl. Enl., I at once saw that this was the Goa Woodpecker of old authors, *P. Goensis*—and it will accordingly stand as *Chryso-*

colaptus Goensis. Wagler of course is in error in putting it as a synonym of *P. strictus.* I have of late obtained it at Nellore, inhabiting the densest portions of the jungles of the Eastern Ghauts.—Length 12 inches, W. 6, T. 3½, Bill (front) 2, Tars. 1.

No. 209.—*P. (Dendrocopus) Hardwickii*—new species—*P. moluccensis* apud Gray and Hardwicke—Jerdon—Blyth, &c.—On comparing specimens from Southern India with the original figure in P. E. pl. 748, 2, and finding moreover that there are several allied species in India much more like this Molucca bird, I am compelled to rename this species, and have accordingly named it after one of the most successful cultivators of Indian Zoology. It appears to be the Cawnpore Woodpecker, Latham, No. 19—the variety A. of his *P. moluccensis* being one of the allied Indian species.

No. 209 bis.—*P. (Dendrocopus) nanus* Vigors.

The dark variety alluded to in my catalogue was identified by me with a specimen of *P. nanus* from central India.

No. 210—*P. squamatus.*—The Himalayan Woodpecker figured by Gould is a much larger species than the one found in Southern India, which Mr. Blyth has named *P. striolatus,* J. A. S. vol. xii. p. 1000, where he also points out, that I have indicated another allied species which he has procured from Assam and named *viridanus.* Those that answer to his *P. striolatus,* I have obtained from the Malabar Coast, and the forests of the Eastern Ghauts.

* No. 210 bis.—*P. (Gecinus) viridanus* Blyth—l. c.—Mr. Blyth subsequently, J. A. S. page 191, says, *P. viridanus* would seem to be *P. dimidiatus* of the Dict. class, though not of Gray and Hardwicke.

No. 211—*P. Mentalis.*—The bird doubtfully referred by me to *P. mentalis* was considered by Mr. Blyth to be the *P. nepalensis* figured in Gray and Hardwicke, and he has since referred it to *P. chloropus* of the Dict. class, evidently

the same bird as the *P. chlorolophus* of Vieillot, Encycl. Meth., which name I presume will stand for the Bengal bird. This however differs so considerably from the allied species of Southern India, that I have no hesitation in considering them distinct—and accordingly bestow on our southern bird the appellation of *chlorigaster.* It differs from the Nepal bird in smaller size, less developed crest, darker abdomen, and various other points which I shall particularize in my Illustrations, for which I have prepared a figure of our southern bird.

* No. 212 bis.—*P. (Brachypternus) micropus* Blyth J. A. S.—vol. 14—194.—I procured a specimen, among a lot of *P. bengalensis,* which appeared to me to be smaller in all its proportions than that species, and sent it to Mr. Blyth, who has named it as above. It was obtained in the jungles of the Eastern Ghauts.

No. 214—*P. badius.*—Mr. Blyth has quite recently (J. A. S. 14. 195) separated the rufous Woodpecker obtained in the north of India from the nearly allied Malayan bird, by the name of *P. (micropternus) phaioceps.* I am not very certain if the South Indian bird be identical or not with this, as I have too few specimens for comparison, but it appears to differ in the colour of the chin and throat, which, instead of being rufous edged with paler, is of a dark olive brown, edged with white. It is also somewhat smaller. Should it prove distinct on further examination, I would suggest the name of *P. (micropternus) gularis.*

No. 215—*P. tiga.*—Mr. Blyth considers a specimen I sent of this bird to be the *P. shorii,* as I had suggested in my catalogue—but the smaller specimens alluded to are probably the real *P. tiga,* or it may be Blyth's *P. intermedius.*

* No. 215 bis.—*P. shorii*—Vigors.

No. 217—*Bucco viridis.*—The true *B. viridis,* as I find on reference to the figure in Pl. Enl. pl. 870, is the bird found

on the Neilgherries, and occasionally in other parts of the Malabar Coast.

* No. 217 bis.—*Bucco zeylanicus*—Lath.—*B. lineatus*, Tickell—*B. caniceps* Franklin—*B. viridis* Jerdon Cat., in part.—This large Bucco is found in all the jungles of India, as well on the East as on the West Coast. I have specimens from Malabar, and the Eastern Ghauts—and have seen others from Goomsoor, and Bengal. The individuals appear to differ somewhat in the form of the bill—but this is not sufficient, I imagine, to form grounds for their separation—as specifically distinct.

Length $10\frac{1}{2}$ inches, W. 5, T. $3\frac{1}{2}$, Bill (front) $1\frac{2}{10}$, Tars. $1\frac{2}{10}$ths.

* No. 216 bis.—*Bucco barbiculus*— Cuv.—A small species obtained by Lord A. Hay from the jungles of Malabar, and of which I had no description, was thus named by Mr. Blyth, to whom I sent a specimen for examination.

Length 6 inches, W. $3\frac{2}{10}$, T. $1\frac{1}{2}$, Bill (front) $\frac{6}{10}$ths.

It differs chiefly from *B. Indicus* in the red of the fore part of the head not reaching so far back, and in having all the parts that are yellow in *Indicus*, bright red ; also in wanting the striated lower plumage.

No. 222.—*Cuculus fugax.*—I think that this the common species of India should be named *Cuculus Lathami*, the name given to the adult bird in Gray and Hardwicke's Illustrations ; I have not seen, nor heard of its having been obtained from any of the Malay countries, and a species in Lord Arthur Hay's collection from Malacca, appears to correspond with Horsfield's description.

* No. 222 bis.—*Cuculus micropterus* Gould.—I have obtained this Cuckoo of late, once in the Carnatic near Nellore. It also probably occurs in the West Coast, but it is certainly rare in the South of India.

No. 223—*Cuculus himalayanus.*—Mr. Blyth has referred a specimen sent him of this bird to the *Cuculus sonneratii.*

Latham, with which he also identifies Horsfield's *pravata*—but I possess a specimen from Malacca very distinct from our peninsular bird, which is probably that species. As this is a rare bird, and only found in the West Coast, I think it not improbable that it may prove distinct from the species taken by Sonnerat, and in that case I would suggest the name of *Cuculus venustus.*

* No. 223 bis.—*Cuculus poliocephalus,* Lath. *C. himalayanus,* Vigors.

I obtained a single example of this Cuckoo in the cold weather, near Nellore.

No. 224 *Cuc. flavus.*—The synonyms I adopted with doubt do not apply to this bird, and the Malayan specimens referred to this bird (of which however *C. merulinus* Scopoli, is a prior name) being usually smaller, and in rather different plumage; the name at present adopted for this Cuckoo is that of *C. tenuirostris,* applied to the young bird in Gray and Hardwicke.

* No. 225 bis.—*Cuculus (Chrysococcyx) lucidus.*—On obtaining access to Brown's Illustrations of Zoology, and carefully examining his birds, I at once recognised his figure of *Trogon maculatus* as an immature bird of this species. It was stated to have been found in Ceylon, and if so, is very probably a rare inhabitant of the forests of the West Coast. It has been procured by Mr. Blyth from central India.

No. 228—*Eudynamys orientalis.*—I think it probable that the *Cuculus honoratus* of authors figured in Pl. Enl. pl. 294, is merely the young of this bird.

* No. 229 bis.—*Zanclostomus tristis,* (Lesson) *longicaudatus,* Blyth.—This Cuckoo has been obtained from the jungles of Goomsoor.

No. 230—*Zanclostomus sirkee.*—Mr. Blyth has recently procured two additional closely allied species to the one found in Southern India, one of which from central India, he considers to be the true *sirkee,* and mine he concludes to be

the *Taccocua Leschenaultii* of Lesson, whose generic name, though not very euphonous, will stand for this division, which is very separable from *Zanclostomus*, partaking more of the habits of *Centropus*, feeding a good deal on the ground.

No. 231 bis. Suppl. Cat.—*Centropus bengalensis.*—As I have lately obtained a specimen of *Centropus lepidus* from the Eastern Ghauts, I am inclined to believe that it was this species that was observed by Mr. Elliot in the Southern Mahratta country.

No. 233—*Cinnyris polita.*—It appears that the name of *Loteniæ*—L., must stand for this Honeysucker, as it was originally given by Linnæus to a bird from Ceylon, and was afterwards misapplied to an African, or Madagascar species, somewhat allied in colouring.

No. 236—*Cinn vigorsii.*—This handsome species is *C. goalparieusis*, Royle—*C. miles*, Hodgson—and *Nectarinia Seheriæ* of Tickell.

No. 236 bis. Suppl. Cat.—*C. longirostris.*—This is the *inornata* of Temminck, now referred to *arachnothera.*

* No. 237 bis.—*Dicœum erythrorhynchos*, Latham, *D. Tickelliæ*, Blyth.—I obtained a specimen of this little species from Malabar through the kindness of my friend Mr. Ward.

No. 238—*Upupa minor.*—Mr. Blyth considers the lesser Hoopooe of Southern India to be identical with the West African species named *Senegalensis* by Swainson—and distinct from *minor* of S. Africa.

* No. 238 bis.—*Upupa Epops.*—The European Hoopooe, common in Bengal, is also occasionally found here. I obtained it on the Neilgherries only.

No. 240—*Merops Philippinus.*—On comparing the figure in the Pl. Enl., I think that our large Bee-eater is not the one there represented, and a Malacca specimen in Lord A. Hay's collection agrees much better with the figure—*Merops*

Javanicus is identified with *Philippinus*—our Indian bird is certainly the Chesnut throated Bee-eater, Latham.

No. 245.—On comparing Malay specimens of *Halcyon capensis* with those of Southern India, a very perceptible difference is at once observed, and, as the former agree exactly with the figure and description in the Pl. Enl., which I had previously been unable to identify with our peninsular bird, I shall now give this the name of *Halcyon bruniceps*. Mr. Blyth (J. A. S. vol. 14) has also recently pointed out the distinctions—which are, the unvarying brown tint of head and hind neck in our Indian bird—to which I may add, that the blue colour of the wings and tail is much deeper in the Malay bird. It is evidently the variety mentioned by Latham, who considered it distinct, as well as his var. D. of the black-capped Kingfisher, No. 27.

* No. 245 bis.—*Halcyon atricapillus*.—This fine Kingfisher must be added to our peninsular Fauna, as I have obtained specimens from the West Coast.

No. 246.—This little Kingfisher will stand, I consider, as *C. tridactyla*. Vide my Illust. Ind. Ornith. pl. 25.

No. 248 bis.—*Ispida rudis*.—As the African and Indian birds are now considered distinct, and as this name was applied to the African bird, Strickland has called the Indian one *Ispida varia*.

No. 253—*Caprimulgus Mahrattensis*.—Mr. Blyth considers that a fine night jar which I lately obtained from the Eastern Ghauts, and which was referred to by me in my Illustrations pl. 24, as probably *C. macrourus* Horsf., will turn out to be Sykes' *Mahrattensis*—and that the true *Macrourus* is a very closely allied species which he lately obtained from Arracan.

* No. 253 bis.—*Podargus Javanensis*.—I received from Captain Roberts of the 36th N. I., an excellent observer, a very accurate account of this bird, which he obtained at the Peria pass, leading from Malabar into the Wynaad.

* No. 255 bis.—*Cypselus leuconyx*—Blyth J. A. S. vol. 14.—I procured this Swift in the Deccan, and have also obtained it from Malabar.

* No. 255 ter.—*Cypselus montanus*—new species.—I must consider this little Swift as distinct from *affinis*, though Mr. Blyth (J. A. S.) only looks on it as a young bird—and I hope to obtain more specimens for comparison. It differs chiefly in its smaller dimensions, but on comparing it with true affinis, various differences appear in the shade of colour, especially in that of the head and neck. It inhabits cliffs on the Neilgherries.

L. $4\frac{3}{10}$, W. 4 [illegible], T. $1\frac{7}{10}$.

No. 257 bis. Suppl. Cat.—This is the *Chætura gigantea* (Tem.) found also in various parts of the Malay provinces. An allied species the *Ch. Macraptera,* Swains., vel *nudipes,* Hodgson, is found in the Himalayas.

No. 259—*Hirundo erythropygia,* Sykes.—This is the *H. daurica* of Authors.

No. 261 bis. Suppl. Cat.—*H. domicola.*—Mr. Blyth informs me that this is identical with *H. javanica,—neoxena,* Gould, and that it is figured in Gould's Bird of Australia.*

No. 261—*H. unicolor.*—This species since referred by me to the Swifts, and called *C. concolor* by Blyth (there being already a *C. unicolor*) has been quite recently referred by that naturalist to the group *Colocalia,* the type of which is the *H. esculenta* of the Malay provinces. This is very interesting, as, if its nests can be discovered on the precipitous cliffs near which it is seen, they will probably be found similar to those of its far-famed congener.

No. 263 bis. Suppl. Cat.—*H. inornata.*—This Swallow turns out to be the *H. rupestris* of the South of Europe. It was also named by Hodgson H. *rupicola.*

(To be continued.)

* Mr. B. has more recently informed me that *H. jewan* is referred to *Javanica,* and *domicola* to *pacifica,* Lath.

XII.—*Descriptions of some supposed New, or Imperfectly Described, Species of Birds.*

By Lord Arthur Hay,

A. D. C. to the Marquis of Tweeddale.

Nisætus albo-niger,—Bl. young ?

From Malacca, and perfectly distinct from any of the other species of the group, though approaching nearest to *N. Cristatellus* in the young plumage, being however much smaller. This bird has the head crested as in *N. Cristatellus;* the feathers forming the crest being black, slightly edged with dirty white at the tips; all the under parts white washed with light fulvous, darkest on the flanks, and thigh coverts; upper parts brown, lightest on the head, two middle tail feathers similarly brown with three distinct broad black transverse bars, and a fainter one near the base of the tail; the outer rectrices lighter on their inner webs, and all the feathers edged with dirty white at the tips; under surface of the tail light, the black bands being seen distinctly only through the two middle and the two outer tail feathers. Primaries deep brown; outer webs of the first black; wings graduated; first quill $\frac{3}{4}$ths the length of the second, which is shorter than the third, while the fourth and fifth are nearly equal, though the fifth is longest; the under side of the wing is white near the flanks and shoulders, while the lower part is barred with black. The tarsus is closely feathered to the base of the toes. The whole form is strictly that of a Nisætus.

Dimensions.

Wings	11 inches.	Middle toe	$1\frac{4}{10}$ inches.
Tail	10 ,,	Bill from gape	$1\frac{5}{10}$,,
Tarsus	$3\frac{2}{10}$,,	,, base	1 ,,
Hallux	$1\frac{3}{10}$,,		

If my bird should on comparison be found distinct from *albo-niger,* I propose the name *Malayanus.*

Buteo (Butaster) fasciatus—New Species.

An interesting raptorial bird seemingly belonging to the group *Butaster*,* Hodgson, was sent to me from Malacca, and which I now describe as probably new, under the provisional name of *fasciatus*. Plumage above deep smoky brown; lores brown cinereous, and so distinct in hue from the surrounding feathers as to be readily remarked. A white superciliary stripe commences over the middle of the ears, a few of the feathers springing from the nostrils having white shafts and centres. The throat and chin are white, a black stripe extending longitudinally from the chin down the middle of the throat; a parallel black stroke bounds the white on each side; the upper part of the breast is of a uniform brown, but the lower part, the belly and flanks, thigh coverts and vent, have each of their respective feathers alternately and transversely banded with light brown and white, presenting a fasciated appearance; the shafts of these feathers are deep brown and preserve a uniform colour even when passing through the white. The upper tail coverts are of a similar hue with the rest of the upper parts, though some of them in my specimen are broadly tipped with white. The tail is smoky brown, broadly barred with three distinct transverse black bands, and one much fainter near the base; the shafts of the tail feathers are light or dark as they pass through either the light or dark parts of the tail. The under shoulder coverts are marked with light rufous brown upon a white ground, the under basal half of the wings is white, the tips of the primaries are black, while the quills are crossed by two or three straggling dark bands. The first quill is two-thirds the length of the wing, and much shorter than the second, which is a little shorter than the fifth, the third and fourth being equal and longest. The bill is black with the gape and basal half of the lower mandible dirty yellow in the dried

* Now *Poliornis*.

skin ; the tarsus is feathered a little beyond the knee and covered by octagonal scales.

DIMENSIONS.

Total length	$11\frac{1}{2}$ inches.	Hallux	$1\frac{1}{10}$ inches.
Wing	13 ,,	Bill from base	$1\frac{1}{10}$,,
Tarsus	$2\frac{7}{10}$,,	,, gape	$1\frac{4}{10}$,,
Middle toe	$1\frac{5}{10}$,,	Tail	8 ,,

Scops Malayanus—New Species.

It was not till after the strictest comparison had been drawn between this species and the *S. Aldrovandi* of Europe that I ventured to consider it as distinct. The grounds upon which I have separated the two species are these. First, the total absence of gray perceived in the plumage of *S. Aldrovandi;* secondly, the superior strength of bill and length of tarsus of that bird; thirdly, the distinct manner in which the under surface of the primaries are mottled, these differences I consider to be sufficient to warrant their separation, particularly as two species from Africa, *S. Capensis* and *S. Senegalensis* have been described and acknowledged as distinct—and also a species from Brazil, without possessing greater distinctions.

The present species was received from Malacca.

I shall now endeavour to point out the more prominent features in the plumage of the present bird. The under surface is distinctly divided into two equal portions ; the first including the chin, throat and breast, being wood-brown mottled with a little white, light rufous, and black, irregularly distributed ; the lower division including the belly, vent, thigh coverts, and under tail coverts, is white, speckled with deep brown and light rufous.

The ground of the upper surface is ferruginous wood-brown, closely speckled with black, and purest on the upper tail coverts ; four large white spots occur on each side of the

back, which when examined will be found to form only the outer webs of the feathers, to which they belong, the inner webs being like the rest of the dorsal plumage; each of these feathers is tipped with black; a little white occurs over each eye, and the cheeks are minutely speckled with white; the ears are bright rufous at the base, but resemble the dorsal plumage at the tips; the bristles which spring from the chin and nostrils are dirty white; the first quill has five rufous spots on its outer web, the second also has five spots, but the two nearest the tip only are rufous, the others being white; the spots on the three next quills are white, and those on the sixth are entirely rufous; the inner webs in *S. Aldrovandi* are barred, but these bars are wanting in the Malay *Scops*, light tawny blotches breaking only the hair brown colour of the quills; the tips of the quills however are faintly and minutely speckled; the third and fourth quills are equal and longest, the second and fifth are equal, and the first is shorter than any; the upper surface being but faintly barred, and hair brown.

The upper mandible of the bill is black, the under dirty yellow; in shape it closely resembles *S. Aldrovandi*, but is neither so high, nor so strong; the tarsus is not feathered as far down as in the European bird, the whole leg and foot is weaker, and the entire bird is smaller.

DIMENSIONS.

Wing	$5\frac{6}{10}$	inches.
Tarsus	$\frac{8}{10}$	,,
Tail	$2\frac{8}{10}$	,,

Buceros Violaceus, Wagler.

Lower portion of the breast, belly, vent, thigh coverts, tips of the quills, and tail, excepting the two middle feathers, white, the rest of the plumage glossy green black; first and

second primaries uniform black, short, narrow, and attenuated at the ends, in a somewhat similar manner to the first quill in the genus *Ptilinopus*, as seen in *Columba (P.) jambos;* head crested as in most *Buceridæ*, that is the longest feathers rising from the nape, and growing shorter towards the vertex. The two middle tail feathers surpass slightly the rest, and show an indication to be tipped with white; these feathers are more pointed than the lateral ones, which become almost truncate in form, and slightly graduated in length; this structure is to be observed also in the following species, as well as in *B. Albirostris, Malabaricus, Gingianus, Gingalensis, Coronatus* (Africa), &c.

The form of the bill in this species is very peculiar, the true line of the culmen may be seen along its whole length; a narrow groove commences at the nostril which is placed in it, and separates in a way the main portion of the upper mandible from its casque; the culmenoid ridge of the casque for half its length is much higher than the occipital plane of the head; the casque is much swollen all its length, though most so in the middle, where, when seen from above, it is broader than the bill; its posterior portion is much narrower than the front of the head, and its anterior portion is much pinched, so as to render it almost sharp; the sides of the upper mandible are concave, and the margins of the bill are dentated, and in my specimen much worn, irregularly notched, and broken. From Malacca.

DIMENSIONS.

Total length......	27 inches.	Bill from gape......	$4\frac{7}{10}$ inches.
Wing............	10 ,,	Gonys............	$3\frac{3}{10}$,,
Tarsus....	$1\frac{9}{10}$,,	True culmen........	$2\frac{3}{10}$,,
Hallux...........	1 ,,	Bill from nostril in a straight line.....	$4\frac{4}{10}$,,
Culmenoid ridge ..	$3\frac{2}{10}$,,		

Buceros Comatus, Raffles.

A specimen of what I consider to be this bird is now be-

fore me, but in case it should not be the same species, I add the following description; head, neck, throat, breast, tip of the primaries, belly and tail white—wings, back, upper and under tail coverts, vent, and thigh coverts, black; the feathers on the crown of the head are stiff, loose in the web, black at the base, with black shafts for half their length; immediately behind the nostril springs a tuft of loose stiff hairy feathers, half the length of the bill, and some of them with black shafts all their length; on the sides of the basal portion of the lower mandible, though not quite at the rictal angle, a few black bristles occur, these are so far spurious in that they show a slight tendency to run into the texture of a feather, a few scattered hairs in lieu of close webs springing from the sides of the shaft; the ciliary bristles are remarkably strong and black; the throat is thinly clothed with feathers; the crest is long and full. The white colour of the feathers is purest underneath the outermost ones which are of a tawny hue. The black colour of the ventral feathers inclines to rusty. The abdominal feathers are black for the basal half of their length.

The bill is of a dull horn colour mingled with yellowish white (in the dry state), there is no decided casque rising from the upper mandible, the highest part of its culmen being hardly higher than the occipital plane of the head; the upper mandible most bulged at the region of the nostrils, but much compressed beyond; the margins of the bill are very plainly serrated, the culmenoid crest is rounded, and not sharp, it occupies two-thirds of the true culmen, the curve of which proceeds along its base in the form of a furrow or groove, which is lost in the swelling of the bill near the nostrils. I regret not being able to detail the caudal structure, as my specimen is somewhat damaged; the claws are (as in most of the *Buceridæ*) deeply grooved on their under surface, thus making the lateral corneous sheathing quite thin and pliable. From Malacca.

DIMENSIONS.

Total length	44 inches.	Bill Nostril in a straight line....	$5\frac{3}{10}$ inches.
Wing............	14 ,,	Culmenoid ridge....	4 ,,
Tarsus.........	$2\frac{5}{10}$,,	True culmen.	$2\frac{3}{10}$,,
Hallux....	$1\frac{2}{10}$,,	Gonys......	$3\frac{7}{10}$,,
Bill from gape,....	$6\frac{2}{10}$,,		

Buceros Malayanus, Raffles. Adult ?

The whole of the plumage glossy black, (appearing slightly green in certain lights) with the exception of the lower ends of the four outermost tail feathers, and the coronal circle, which are white—bill and feet black. Three specimens are before me, two agreeing entirely in their plumage, structure, and colouring of the bill, the other differing from them by having the bill perfectly white, and its protuberance differently shaped, as if not fully developed, and in having the white of the tips of the outer rectrices more developed; the crest also in this supposed young bird is not so large, as if it also had not arrived at maturity.

The bill without the casque in the adult bird is very similar to that of *B. carinatus*, Blyth, while that of the young bird resembles it closely, the casque not being fully developed in front, its superior margin hardly breaking the true culmen; the anterior edge of the casque in my adult bird, on the contrary, is almost perpendicular to the occipital plane of the head, while its posterior portion divides the feathers of the head, as it also does in the young bird; this posterior portion is bulged and rounded; as the casque advances on the beak, it becomes compressed, and its culmenoid ridge is so rendered quite sharp; the commissure in the old bird is toothed, as in the *Pteroglossi,* this is not so distinctly visible in the young bird; the gular region is clothed with feathers, though the parts near the edges and angles of the lower mandible are bare; this nakedness is more marked in the young bird than in the old ones. The crest has its mesial portion quite black, and the rest white; the black not being so extended posteriorly as the white.

DIMENSIONS.

Adult.

Total length	29 inches.	From nostril to the tip in a straight line	4 inches.
Wing	$11\frac{5}{10}$,,	From anterior edge of protuberance to the tip of the bill.	$2\frac{6}{10}$,,
Tarsus	$1\frac{9}{10}$,,	From base to tip in a straight line	$4\frac{6}{10}$,,
Hallux	$1\frac{1}{10}$,,	Of white portion of the crest from above the eye	$3\frac{7}{10}$,,
Gonys	$2\frac{6}{10}$,,		
Bill from gape	$4\frac{3}{10}$,,		
Protuberance from base	3 ,,		

Young.

Total length	28 inches.	Bill from gape	4 inches.
Wing	$11\frac{3}{10}$,,	,, nostril	$3\frac{5}{10}$,,
Tarsus	$1\frac{9}{10}$,,	Total length from base	$4\frac{5}{10}$,,
Hallux	$1\frac{1}{10}$,,	White portion of the crest	3 ,,
Gonys	$2\frac{2}{10}$,,		

Buceros Elliotti—New Species.

This species resembles the last one very closely, but it is much larger, and wants the white bordered crest, otherwise the description I have given of the plumage of *B. Malayanus* will do for this one; in my only specimen, the bill has evidently arrived at maturity, and is perfectly white; the posterior portion of the casque covers a portion of the vertex, and is eight-tenths of an inch higher than the occipital plane, its posterior edge being one and seven-tenths of an inch behind the nostril when measured in a straight line; a ridge proceeds from the nostril, and marks where the true culmen would be if the casque were absent; this ridge ends where the culmen begins; two more ridges run almost parallel to it, and above it, thereby causing two corresponding furrows; a third furrow is formed by the uppermost ridge and the swell of the casque, which commences to bulge above it; a fourth ridge is thus formed, but which is much broader and more rounded than the lower ones, and is bounded along its superior edge by a fourth furrow which is the last. The casque becomes compressed as it advances on the bill, and is at last narrowed into a point, its anterior edge instead of being perpendicular with the occipital plane, forms with it (supposing the occipital plane to be continued) an obtuse angle, and consequently an acute

angle, with the true culmen; the margins of the bill are serrated, and the whole bill is a miniature resemblance of that of our common Malabar Hornbill, *B. pica*.

The first and second quills are formed similarly to those of *B. violaceus*.

DIMENSIONS.

Total length.. ..	34 inches.	True Culmen ...	$3\frac{4}{10}$ inches.
Wing..	13 ,,	Bill from gape....	$5\frac{8}{10}$,,
Tarsus	$2\frac{4}{10}$,,	,, nostril..	$5\frac{5}{10}$,,
Hallux.........	$1\frac{5}{10}$,,	Gonys......	$3\frac{6}{10}$,,
Culmenoid ridge.	$5\frac{2}{10}$,,		

This Hornbill would be identical with Eyton's *bicolor* if the three lateral rectrices and the tips of the rest of the tail were white (rectricibus tertiis lateralibus caudæque apicibus albis ;) but as this species has got the tips only of its four lateral rectrices white, and the two middle tail feathers wholly black, it does not agree with Eyton's description.

Picus Melanogaster—New Species.

A very distinctly marked species of Woodpecker from Malacca, and apparently new; the only two specimens I possess are not in full plumage, their general colours being as follows: Back and wings when closed red marroon with a waxy gloss—europygium of a dull rusty brown, or of duller and browner tint than the back; head (as seen in my immature specimen) rusty brown, with the forehead much lighter and inclining to tawny brown; the usual Picine crest not much developed and longest at the nape, where the tips of the feathers are of a bright crimson or almost blood red, and bearing in colour and texture though not in form a somewhat similar resemblance to the tips of the secondary quills of the *Wax wings;* the whole of the under parts excepting the chin are dark olive rusty brown, almost inclining to black, and to which colour I suspect the feathers of the old birds turn; the chin and forehead are similar in

colour ; the upper tail coverts and the rectrices are brownish black, barred with lighter bands, the middle rectrices not forming an exception ; first quill of the wing almost spurious and the outer webs of the Primaries are distinctly spotted, and their inner webs more faintly barred with a colour similar to the caudal bands. The bill is ivory white, and the feet in the dried skin black.

This bird's generic characters seem to place it near the genus *Dendrocopus*, if not in it.

DIMENSIONS.

Total length	$8\frac{1}{10}$	inches.	Outer hallux	1	inch.
Wing	$4\frac{8}{10}$	,,	Outer toe	1	,,
Tail	3	,,	Bill from base	$1\frac{3}{10}$	,,
Tarsus	$\frac{8}{10}$ths.	,,	,, gape	$1\frac{5}{10}$	,,

Gracula Religiosa, Linné.

Under the name of *G. religiosa,* Linné confounded two, if not more species. Cuvier subsequently separated the largest species which is found in Malasia from the continental Indian species, naming the former *Javanus,* and the latter *Indicus,* without regard to Linné's prior name of *religiosa,* (which was applied to two species whose distinctness he allowed in his *systema naturæ,* but to which he only gave the one name above mentioned.) This is I believe generally allowed to apply to the larger or Malasian species, but on reading over attentively the notice, given by Linné in his system, of the *G. religiosa,* I find that the first bird described is evidently our Peninsular bird, as it is distinctly said that the variety *No. 2* is much larger. The name *religiosa* therefore ought most certainly to be retained to the first described species, and not to the variety. I have now before me specimens of three distinct species, the first from Malacca, the second from Malabar, and the third from Northern India and Arracan ; the third species is intermediate in size between the Malacca and Malabar bird, and differs in other points also, which I will

point out. To the Malabar bird, as I said before, I would retain Linné's name of *religiosa;* to the Malacca bird, should it prove the same as the Javanese species, the name of *Javanus;* and to the third species which has not as yet been noticed as distinct, I would, to avoid confusion, give Cuvier's name of *Indicus,* and so avoid adding another name to the already overloaded list of synonyms.

As the two names *religiosa* and *Indicus* have become so mixed up that they have been applied by some to our Indian bird, and again in the opposite way by others to the Malasian bird, the following description and dimensions will perhaps serve to aid the elucidation of the species, should my previous remarks not prove satisfactory.

1st.—*G. religiosa,* Linné, Jerd. Cat. 168.

The whole of the upper plumage and the lesser shoulder coverts glossy purplish black, the metallic reflections changing to green on the lower part of the back and upper tail coverts; under plumage the same as the upper, though not so bright; under tail coverts dull black and fringed only at the ends with the glossy hues of the general plumage; this latter character indeed is possessed by all the feathers when taken singly. Wings and tail, coal black without reflections; the spurious quill is very short, and quite black; the first primary has a white mark on its inner edge only; the next six have the white marks on both sides of the shaft, but forming in the sixth (that is the seventh including the first) a roundish blotch, and not occupying the whole breadth of the inner web; the wattles on the head commence below each eye, pass beyond the ear where each forms a small flap, and then returns on to the head, so dividing the occiput and nucha into three distinct portions, which are closely clothed like the rest of the head with short velvety feathers. The legs are yellow, the bill orange, and the eyes deep brown.

Specimens in my Cabinet both from Malabar and Goomsoor agree perfectly in their colours, form, and dimensions.

2d.—*G. Javanus, Eulabes Javanus,* Cuvier. *G. religiosa,* Cuv. apud Horsfield, Zoological Res. In Java. *Eulabes Javanus,* Vieil.

This species is perfectly distinct from the former, and is as Linné remarks much larger; but its superior size is not its only distinction, for the form of the bill and shape of the wattles form very marked differences; in plumage, the two agree pretty closely, though perhaps the Malay bird is the brightest of the two; a large stripe of deep velvety black feathers begins just above each eye where it is narrowest, and widens as it recedes, occupying the greater portion of each side of the head, and nearly joining at the back of it; from the base of the bill, and bounded on both sides by these black lateral bands, passes the medial stripe of the feathers which clothe the remainder of the head, and which are of a purplish gloss, similar to the rest of the plumage; this stripe narrows as it recedes, its narrowest portion being where the lateral bands so nearly join; below each eye is a naked space of orange coloured skin, and quite unconnected with the large wattles that occur at the back of the head, and which commence from behind each eye, occupying but a very narrow space at first, and then suddenly widening into two broad four cornered flaps.

The distribution of the white on the *Primaries* and the colour of the bill and legs is as in the former species. The bill, though preserving a similar structure, is twice the height. This species is I believe found in all Malasia, though my specimens were received only from Malacca.

3d.—The species to which I would retain Cuvier's name of *Indicus* is intermediate between the first and second; the bill is rather larger than that of our Peninsular species, but the wattles partake in form of both the former species; in the manner that they are placed below the eye, they resemble those in *G. religiosa,* while from their not returning on to the occiput, they bear some affinity to *G. Javanus;* the black

lateral bands hardly observed in *G. religiosa*, and so marked in *G. Javanus*, occur in this species only before and behind the eye but not over it; thus causing a hiatus which is replaced by the proper feathers of the head; in size the *G. Javanus* is the largest, and the Peninsular species the smallest, while the only distinction in the general plumage of this species, and which is perhaps merely the effect of age, is, that the primaries and secondaries are edged with rusty brown, thus almost forming a band across the wing.

I shall now add the dimensions of all three species.

	The Peninsular Species. *G. Religiosa*, Linné.	Malay Species. *G. Javanus*, Cuvier.	Northern Indian Species. *G. Indicus*.
Total length	$8\frac{5}{10}$	10	$9\frac{8}{10}$
Wing	$5\frac{5}{10}$	$6\frac{9}{10}$	$6\frac{5}{10}$
Tarsus	$1\frac{1}{10}$	$1\frac{4}{10}$	$1\frac{2}{10}$
Middle toe	$1\frac{1}{10}$	$1\frac{6}{10}$	$1\frac{2}{10}$
Hallux	1	$1\frac{3}{10}$	$\frac{9}{10}$
Tail	$2\frac{5}{10}$	$3\frac{8}{10}$	$3\frac{7}{10}$
Bill from base	1	$1\frac{2}{10}$	$1\frac{1}{10}$
„ from the			$1\frac{3}{10}$
rictal angle	$1\frac{3}{10}$	$1\frac{4}{10}$	$1\frac{3}{10}$

The difficulty attending the description of species so apparently similar and yet differing so materially in particulars, will I trust plead some excuse for any faultiness in the above remarks; should Cuvier's name of *Indicus* be found to apply to our common species, or to the Malay bird, I would propose that of *intermedius* for the species I have provisionally retained to *G. Indicus*.

The outline of the bill given in Swainson's synopsis agrees with our Peninsular species, and is evidently meant to represent that of Linné's *G. religiosa*.

Ceblepyris Culminatus—New Species.

I received this species from Malacca, and it seems to differ from any that have as yet been described. General cast of the plumage iron-gray, uniform on the head, back of the neck and black under parts, and upper tail coverts, lighter, speckled and striated with white; a black mark from the base of the

bill to the eye. Primaries slightly edged with white, secondaries, more so ; under surface of the wings uniform hair brown without white, two middle tail feathers cinerous brown, tipped with white,—Bill moderate, not compressed, and high. Bill and feet black.

DIMENSIONS.

Total length...	$6\frac{7}{10}$ inches.	Tarsus..........	$\frac{7\frac{1}{2}}{10}$ inches.
Wing...	$3\frac{7}{10}$,,	Bill from base...	$\frac{6}{10}$,,
Tail...	$3\frac{3}{10}$,,	,, gape...	$\frac{8}{10}$,,

Muscicapa Bella—New Species.

General dorsal aspect cobalt blue, the head and shoulders of a lighter and more brilliant tint ; the blue on the back of the neck changing in some lights almost to violet ; chin, throat, cheeks, and breast dull blue-black ; lower part of the breast, the belly, vent, and under tail coverts pure white ; flanks dusky, wings hair brown beneath, under shoulder coverts light blue ; spurious quill very short and dark without any blue on the outer edge, all the primaries excepting the first, edged with blue on the external webs of the feathers, but not reaching to the tips of the three first, so that when the wings are closed it appears blue, excepting at the ends.

The tail, which is moderate, has only the two middle feathers wholly blue on the upper surface ; the remainder being so on their outer webs ; the under surface of the tail is deep black ; the bill and feet are black. In form the bill resembles that of *M. Cærulea*, Vieil, though it is rather thicker and more robust. From Hong-kong.

DIMENSIONS.

Total length ...	$6\frac{3}{10}$ inches.	Middle toe.....	$\frac{6}{10}$ inches.
Wing..........	$3\frac{3}{10}$,,	Hallux..........	$\frac{4}{10}$,,
Tail.	$2\frac{9}{10}$,,	Bill from base....	$\frac{4}{10}$,,
Tarsus.......	$\frac{6}{10}$,,		

Phœnicornis ? Aureopygia—New Species.

This little bird does not strictly belong to the genus *Phœni-*

cornis, and it is with doubt therefore that I refer it to the group; the distribution of its colours show however a decided affinity to *P. peregrinus*, and in other respects it seems nearly allied to it.

The plumage is of a silky texture, and puffy upon the rump, where it is of a rich golden yellow, and of a lighter hue than the feathers of the throat and upper part of the breast which are deep orange; the lower part of the breast and the belly are rich lemon yellow; the flanks are dusky and the under tail coverts and scapulars pure white; an orange coloured streak commences at the base of the upper mandible and passes round the eye to the ears; the remainder of the plumage is dull black. From Hong-kong.

DIMENSIONS.

Total length....	$4\frac{3}{10}$ inches.	Tarsus...... ...	$\frac{6}{10}$ inches.
Wing........ .	$2\frac{9}{10}$,,	Middle toe.....	$\frac{6}{10}$,,
Tail..	2 ,,	Hallux..........	$\frac{3}{10}$,,

Muscipeta atrocaudata, Eyton?

Cat. of Malay Birds, Pro. Zool. S.

A lovely species of Muscipeta now before me and shot near Hong-kong, seems nearly to agree with Eyton's description of the above named bird; but as his description is very short, and is taken from a Malay specimen, I take this opportunity of fully describing my specimen, which is evidently an adult. Head, cheeks, throat, breast and tail coal black without reflections; belly and under tail coverts pure white; flanks dusky; back, shoulder and wing coverts, deep glossy marroon purple, inclining to black on the upper tail coverts. Primaries black; secondaries edged with the same colour as the back; bill and legs black, the head ornamented with a long black crest. As there are some discrepancies between my specimen and Mr. Eyton's short description, I add the latter. "Toto corpore purpureo-atro, sed pectore imo abdomineque alba."

It will be seen that the expression "toto corpore purpureo-atro" does not altogether apply to my specimen, and as mine is from Hong-kong, it may probably be a new species, in which case I beg to propose the specific name of *elegans*.

DIMENSIONS.

Wing..	$3\frac{5}{10}$ inches.	Body of tail	4 inches.
Tarsus........ ..	$\frac{6}{10}$,,	Bill from gape....	$\frac{9\frac{1}{2}}{10}$,,
Hallux..........	$\frac{5}{10}$,,	,, base....	$\frac{7}{10}$,,
Middle toe	$\frac{5}{10}$,,		

The two middle tail feathers exceed the body of the tail by 7 inches and 7-10ths.

Genus *Brachypus*, Sw. Sub-Genus *Hœmatornis*, Sw.

Hœmatornis atricapilla, Vieil. *Chinese Bulbul.*

I received this interesting species from Amoy, and have no doubts in referring it at once to Swainson's sub-genus Hœmatornis, and as one of the most typical forms.

The head is black and sub crested; the chin and base of the lower mandible the same as the wings, which are of a light hair brown, deepest upon the quills; the tail and back are of the same tints, the feathers of the back being deepest in colour towards the shafts; the lower end of the tail feathers is the darkest; all except the middle pair are broadly tipped with white, most marked on the under side; the cheeks, throat, breast, belly, flanks, upper tail coverts, and thigh coverts are of a uniform dirty white; the under tail coverts scarlet.

The bill is black, distinctly notched, and is strictly that of a Hœmatornis, at the gape there are but few bristles;—the wings are moderate, the first quill is very short, half the length of second, the third, fourth, and fifth, are graduated, the latter longest; the legs are black and feathered below the knees, the tarsus short and strong;—the anterior scales simple, the lateral toes are equal, the middle toe is shorter than the tarsus,—the claws are compressed and pointed, the tail is more or less square, and consists of twelve feathers.

Caprimulgus Pulcher—New Species.

The Beautiful Goat Sucker.

I received this splendid Goat Sucker from Malacca, and having failed in finding a description at all approaching to it, hesitate not in describing it as new.

Black and deep brown predominate throughout its plumage, though markings of tawny yellow mingled with light brown are perceived on the belly and breast; the usual white mark on the throat is seen in this nightjar, but no other white markings are to be found in its plumage: the head is of the richest speckled brown, with a black streak down the middle; the chin and upper part of the breast are mottled richly with black and brown, the breast is barred transversely with black and rich fulvous, each feather being black at the base, then fulvous, and then a slight edging of black. On the belly, flanks, and under tail-coverts, light tawny predominates, the black edgings being narrow; the wing coverts are of the same rich mottled brown seen on the head; the primaries are coal black, with rufous spots on their outer webs; on the second quill eight of these spots occur, as also upon the third. On the under side of the wing the same spots are visible though fainter; the second quill is longest; the tail is also deep black slightly variegated with brown; the tail surpasses the wings by one inch and three-tenths. The bill is very small, and the tarsus as in Caprimulgus.

Dimensions.

Total length	10 inches.
Wings from shoulder	8 ,,
Tail	$5\frac{6}{10}$,,

Muscicapa Pectoralis—New Species.

It is with doubt that I refer this lovely species to the restricted genus Muscicapa, and yet its large size is perhaps the only objection to its being so classed.

Both the male and female birds were sent to me from Malacca, and after a diligent search amongst various Authors, no mention can be found of them, and so I now describe them as new.

The male and female birds agree in the general tone of the plumage, which is of a dark indigo blue, the points of difference between them being the rich claret coloured breast, black throat, cheeks, superciliary stripe, and forehead, of the male ; while in the female the whole plumage is uniform blue, though perhaps darker on the throat and breast ; the dorsal plumage is soft, long and puffy, and when ruffled shows white at the base of the feathers, as do also the feathers on the flanks ; the male bird is slightly larger than the female ; the wings are moderate and slightly rounded, the fifth quill is longest, the others graduated, the tail moderate and even ; the tarsus is short and weak ; the inner toe is shorter than the outer, and the inner and outer claws are remarkably short. The bill is Musicapine, and resembles that of *Chaptia Æneus*, though more depressed ; the upper mandible is distinctly notched, and the rictal bristles are strong, and numerous ; the bill only commences to be compressed near the end ; the base of the bill is thickly set with short stiff feathers.

DIMENSIONS.

Total length........	7 inches.	Wing from shoulder.	$3\frac{4}{10}$ inches.
Bill from base.....	$\frac{6\frac{1}{2}}{10}$,,	Tail...............	$3\frac{5}{10}$,,
		Tarsus............	$\frac{7}{10}$,,

Muscicapa Zanthopygia—New Species.

As this species seems to be undescribed, I add the following description.

Head, cheeks, lesser shoulder coverts, back, and the upper tail-coverts, olive green, rump saffron yellow. Chin, throat, belly, flanks, and under tail-coverts light straw yellow, mixed with olive on the breast and flanks, inclining almost to white on the under tail-coverts—primaries and tail hair brown—

scapulars the same edged with white—secondaries tipped with white—the upper mandible deep brown—the under yellowish at the base—feet plumbeous, first quill spurious, third and fourth nearly equal, third longest.*

The bill is intermediate between that of a Muscicapa and Saxicola—the rictal bristles are few and weak—the tarsus is lengthened, and longer than the hallux—the middle toe is long—the inner toe slightly shorter than the outer, the claws are much curved. From Malacca.

DIMENSIONS.

Total length.......	$4\frac{8}{10}$ inches.	Tail...	$1\frac{9}{10}$ inch.
Bill from base....	$\frac{4}{10}$,,	Tarsus.............	$\frac{6}{10}$,,
Wing from shoulder.	$2\frac{7}{10}$,,		

Turdinus ? Superciliaris—New Species.

This remarkable bird from Malacca seems to me to be referable to the genus *Turdinus*, though with doubt. Two specimens are now before me—one evidently the mature male, the other either the female, or young. The former has a distinct white superciliary stripe—the rump, upper tail-coverts, and tail are bright rufous, the latter tipped with a broad deep brown band; head, nape, back, chin, throat, and breast, dark smoky black, deepest above; wings deep brown; abdomen, flanks, and under tail-coverts white washed with rufous; bill black; legs pale yellow. Length $8\frac{1}{2}$ inches, of wing $4\frac{2}{10}$, of tail 4, tarsus 1, bill from gape, $1\frac{1}{10}$, at base $\frac{8\frac{1}{2}}{10}$.

The young bird differs in having its plumage above mixed with rufous, in being smaller, and in wanting the superciliary stripe. At first sight this curious bird gives one the idea of its being a large *phœnicura*. It is, however, decidedly *meruline* in form, and if separable from Turdinus, I would propose

* Since writing the above, I have seen the male of this species, in the collection of Dr. Cantor at Calcutta. It differs from the female in being much more brilliant in its hues—being bright yellow where the female is dirty light yellow, and deep black where the female is merely dusky.

placing it in a new genus to which I would give the name of *Turdirostris,* and characterize it as follows:

Bill strong, high, slightly longer than the head, and much compressed—gonys ascending, commissure almost straight—culmen slightly curved—maxilla obsoletely notched, weakly hooked—nares ovate, situated in a broad shallow groove, and near the commissure, protected by thick-set, stiff feathers, and bristles. Rictal bristles very strong and defending the eye. Legs strong—tarsus moderately long, longer than the hallux. Toes moderate, inner toe shorter than the outer, middle toe equal to the tarsus, claws moderately strong, that of the middle toe bulged internally, of the hallux very strong, curved and sharp. Wings moderate, almost pointed. 1st quill short, 2d shorter than the 3d, 5th and 6th equal and longest. Tail long square, of 12 feathers.

NOTICES.

METEORIC STONE.

A large meteoric stone fell at Voolapilly in the Mundapettah division of the Rajahmundry district, on the 4th November, 1844.

Mr. Bird, Collector of the District, kindly sent the depositions taken at the time and reported to him, which in substance are as follows:

About 3 or 4 A. M. of the 4th November, a bright light was seen in the heavens by a night watcher in one of the fields near this village, accompanied at first by a loud humming sound: the light rapidly increased in intensity, and in a very few moments appeared to fall to the ground with an explosion like that of a large gun. It appeared to the observer to fall very close to him, and for some time he was so dazzled by the intensity of the light, and stupified with alarm, that he was unable to move. After a few minutes, he recovered, and endeavoured to find where it had fallen, but in vain; though he said it was so near as to have thrown some mud and dirt on him. This, however, is easily accounted for, as the field was under cultivation. He represented that the night was clear and calm; he was standing looking eastward at the time, and the Meteor appeared to come from the South. He described its appearance as resembling some native firework, and that the light, at first dull, afterwards

became dazzling white. A few days afterwards a large hole, one yard deep and half a yard in width, was found in a piece of cultivated paddy land, where the watcher had been stationed, by the Braminy owner of the field, whilst weeding, which, on examination by a stick, was found to contain some dark hard substance. He called some of his neighbours and had it dug out, when it was found to be a 'stone mixed with iron,' the weight of which was ascertained to be $37\frac{1}{4}$ seers or about 75 pounds. Mr. Bird has sent to the Literary Society a large fragment weighing 30 pounds, it having been broken by the villagers in the hope of finding gold. It does not appear to differ in external characters from the meteoric stones hitherto described, and will doubtless on analysis prove identical in composition.

METEOR AT MADRAS.

The following account of a singularly beautiful Meteor seen here, from the pen of T. G. Taylor, Esq., the Honorable Company's Astronomer, appeared in the columns of the Madras *Spectator* of the 9th August.

"A Meteor of singular beauty and brilliancy was witnessed at Madras, at ten minutes past seven o'clock on the evening of Saturday the 2d instant. Its commencement was hid from my view by trees, but its course, as well as could be judged from the progress of the shadow of an adjoining verandah, was from NNE. to S., passing within about thirty degrees of the zenith. It was visible during about two seconds of time, in which interval it passed over an arc of at least eighty degrees, and finally burst with an intense degree of brightness at about twenty degrees above the horizon, due South. I immediately commenced counting seconds, and at the expiration of three minutes and fifty-eight seconds (or 238 seconds) was gratified in hearing a peculiarly loud but low and deep toned report, followed by a vibratory sound somewhat resembling that which distinguishes distant thunder. Assuming the velocity of sound to be 1180 feet per second, the report must have taken place at a distance of 53 miles from me; and with reference to the altitude, it would appear that it must have taken place at about 18 miles above the surface of the earth, at a place situated 50 miles to the South of Madras, or a few miles to the South of Sadras.

"In the absence of data to furnish the actual track pursued by this Meteor, it may not be uninteresting to state, that the least velocity it could have attained was 25 miles per second—certainly greater than the velocity of the earth in its orbit.

" *Madras, 6th August,* 1845. T. G. T."

XIII.—Proceedings of the Madras Literary Society and Auxiliary Royal Asiatic Society.

At a Meeting of the Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held on Monday evening the 14*th August*, 1843.

Read a letter from C. P. Brown, Esq., dated 24th July, 1843, offering to the Society for sale "Causes Celebres," 27 volumes, priced at £ 4-10, besides charges of shipping, &c. Accepted.

Read two letters from Messrs. Allen and Co., dated London, 24th and 31st May, 1843, forwarding an Invoice for the monthly parcel of periodicals of June last, transmitted to the Society, and stating that they have included in the parcel a new Novel, (the False Heir), by James; and begging to know when works of an undoubted character are published, whether they may always venture to send them, leaving the bulk of the books to be ordered from Madras. Stating also that they do not understand what is meant by "Heber's Works," Elrington; and that they are at a loss to know what to send, the works of Heber being various, and not published in a collected form.

Resolved,—That the Society authorize Messrs. Allen and Co. to use their discretion in sending out a few works which are of undoubted character and interest, leaving the bulk of the works to be ordered from Madras; and that they are particularly requested not to forward any reprints of works which have appeared in the Magazines, unless expressly ordered.

Resolved,—That a letter of thanks be sent to Captain Newbold, mentioning that the letter to Dr. Jerdon was intended to have been a joint letter to that gentleman and Captain Newbold.

That a copy of Mr. Elliot's Analysis of the Canarese MSS. be sent to Captain Newbold, and the original MS. be returned.

The thanks of the Committee to be given to Walter Elliot, Esq. for having prepared the Analysis.

Resolved,—That the Secretary be authorized to wait upon the President, requesting him to fix a day for a General Meeting, to elect a member of the Committee in the room of N. B. Acworth, Esq.

Resolved,—That the Secretary be requested to take steps for completing the Society's set of the Asiatic Annual Register.

At a Special General Meeting of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held at the Society's Rooms at the College, on Friday, the 1st September, 1843.

The Secretary stated that according to the existing rules of the Society there should always be twelve members of the Managing Committee, and that the present meeting has therefore been convened for the purpose of electing a member for the Committee in the room of N. B. Acworth, Esq., who has left the Presidency.

The meeting then proceeded to elect a member from among the subscribers to the Society, when it was proposed by Walter Elliot, Esq. that Lord Arthur Hay be nominated a member of the Committee, which proposition being seconded by Lieutenant Colonel Felix, he was accordingly elected.

At a Meeting of the Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held on Tuesday evening, the 19*th September*, 1843.

Resolved,—That the following letter be addressed to the Secretary to Government with reference to the resolution passed at the Meeting of the 11th May last.

To

G. D. Drury, Esq.

Chief Secretary to Government.

Sir,

I am requested, by the Committee of Management of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, to bring to the notice of Government, that there are at present in the Library at the East India House a number of manuscripts in the languages peculiar to Southern India, forming part, and the Committee have reason to believe the most valuable part, of the collection of the late Colonel Colin Mackenzie.

As these manuscripts cannot well be deciphered and translated without the assistance of learned Natives, it is obvious that there is little probability of their ever being turned to account whilst they remain in England; and as their contents may tend to furnish much valuable information elucidatory of the ancient history, literature, and antiquities of Southern India, the Committee are induced to suggest, through the Government, to the Honorable the Court of Directors, the advisability of the manuscripts in question being transmitted to this country, and the grant of a small sum with the view of effecting their translation.

Should the Honorable Court be pleased to accede to this suggestion, the Committee will be happy to render all the assistance in their power

in procuring eligible persons for the task, and to take part in its superintendence, and they will engage to publish the translations free of expense either in their own Journal, or in that of the Parent Society.

Should the Honorable Court deem it expedient to transmit only a portion of the manuscripts in the first instance, the Committee would suggest, that the works mentioned in the accompanying list should be selected for the purpose.

LITERARY SOCIETY,
College,
23*d September*, 1843.

I have the honor to be, &c.
(Signed) J. MINCHIN,
Secretary M. L. S. &c.

Memorandum by Mr. C. P. Brown, on the MSS. in the East India House Library.—When I was in England seven years ago, I framed catalogues of the manuscripts lying in the East India House Library. I mean those manuscripts which were in the Telugu, Canarese, and Tamil characters, which had laid unexamined and uncatalogued, some for twenty, others for forty years. As it is now proposed to send a portion of these books to Madras, I have been desired to specify those volumes, which may as well be left in Leadenhall Street: we having those works in plenty at Madras.

Accordingly all the collection should be forwarded to Madras, excepting the volumes noted in the following Memorandum.*

All the remaining numbers in the three lists should now be forwarded to Madras for examination. About one half of them are without title-pages, and for this reason are left unnamed in the catalogues I drew up. On these books being received at Madras, Natives will easily affix the proper title-pages: and then we may be able to select a large proportion to be immediately returned to London, because superfluous here.

The selection made in the present pages may enable the Librarians in England to retain the volumes here noted: but these will be retained as mere useless curiosities. I should certainly advise the transmission of the entire series to Madras without selection.

And that for an obvious reason, in examining the books it will be requisite to arrange them anew, in a more correct catalogue, and for this reason it is desirable that the entire collection should be examined simultaneously.

2*d September*, 1843. (Signed) C. P. BROWN.

* The Memorandum only specified the numbers not the titles of the books, and has therefore been omitted.

Resolved,—That an opportunity having offered for the purchase of "Corps D'Extraits de Chivalerie," that it be obtained for the Society.

At a Meeting of the Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held on Friday evening, the 20th October, 1843.

Resolved,—That the following Books be purchased for the Society:

The Banker's Wife, by Mrs. Gore.
Memoirs of the Marquis Pombal.
Sir E. Seward's Narrative of his Shipwreck.
Owen's Lectures on Invertebrate Animals.
Milton's Prose Works.
Barrow's Works, octavo edition, London, 1818.
Buckland's Reliquiæ Diluvianæ.
Baker's (Sir R.) Chronicle of the Kings of England.
Dodd's Church History, the 5th vol.
Forbes' Travels in the Pyrenees and Switzerland.

At a Meeting of the Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held on Monday evening, the 20th November, 1843.

Resolved,—That the following works be ordered out from England for the Society.

A second-hand copy of the Asiatic Annual Register, complete if procurable.
The Life of Lord Sydenham, by Powlett Scrope.
Dr. Henry's Memoirs of a Military Life.
A second-hand copy of Dryden's Works, by Sir W. Scott.
Beaumont and Fletcher, by Moxon.
Lettres de Madame de Sevigny.
Montaigne's Essays, the best French edition.
Masillon, Ouvres de.
Bossuet, ditto: all published by Didot, in imperial octavo, in double columns.
Champolion, Grammaire Ægyptienne, also by Didot.

At a Meeting of the Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held on Tuesday evening, the 12th December, 1843.

Read a letter from Monsieur Garcin de Tassy, dated Paris, 6th May, 1843—acknowledging the receipt of the Society's letter of the 8th October last, and requesting a copy of the 2d volume of the "Arabian Nights," in Hindoostany, printed in Madras.

Resolved,—That a bound copy of the Arabian Nights in Hindoostany be presented to Monsieur de Tassy, in the name of the Society.

Read a letter from M. Annuntachary Bramin, dated 25th November, 1843, forwarding a Sanscrit Poem in Telugu characters, composed by him in praise of John Goldingham, Esq.

Resolved,—That the same be acknowledged.

Mr. Walter Elliot lays on the table Lieutenant Braddock's Account of the Seven Pagodas, the Rev. W. Taylor's Sixth Report on the Mackenzie Manuscripts, and Captain S. Best's paper on Rain Gauges.

Resolved,—That these papers be sent in circulation to the Committee of Papers.

[These have been published in No. 30 of the Journal.]

On the motion of R. Cole, Esq., it is determined that all the numbers of the Society's Journal, containing papers by Captain Newbold, be forwarded to him.

Resolved, on the motion of the Rev. G. Knox,—The Hortus Malabaricus be sent to Dr. Jerdon at Nellore, in compliance with his request.

Resolved,—The following works be purchased for the Society.

Colonel Campbell's Reminiscences of Sports in Ceylon, Ehrenberg on the remains of Fossil Infusoria.

At a Meeting of the Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held on Monday evening, the 22d January, 1844.

Read the following letters from the Secretary to the Bombay Branch Royal Asiatic Society, dated 7th September, 1843.

Bombay Asiatic Society's Rooms,
7th September, 1843.

To

The Secretary Literary Society,
Madras.

Sir,

Under instructions of the Bombay Branch Royal Asiatic Society, I have transmitted for the Library of the Literary Society of Madras to you a

lithographed copy, in 2 vols. of the Vándidád, in the Zand language, but Gujarathi character, with a Gujarathi translation, paraphrase, and comment, by Aspandiarji Framji and other learned Dasturs of the Kádmi sect of Parsis. Of this work, the Society has had 25 copies lithographed at an expense of upwards of 1,000 Rupees, with the object of preserving a work now become rare in MS. and of distributing it amongst the principal Libraries in Europe and Asia. I shall be happy to receive an acknowledgment of the receipt of the work. The Society have also directed the Izashni, and Vispard, which compose the doctrinal standards of the Parsi faith, and the larger liturgy in use among the Zooroastrians, which will be forwarded as soon as ready.

The MSS. from which these works are copied are in possession of the Rev. Dr. John Wilson, late President and at present Honorary President of the Society.

I have the honor to be, &c.

(Signed) JOHN G. MALCOLMSON,

Secretary B. B. R. A. S.

Resolved,—That the Society's thanks be communicated through the Secretary to the Bombay Branch Royal Asiatic Society for the same.

Read a letter from the Secretary to the Bombay Branch Royal Asiatic Society, dated 27th December, 1843.

BOMBAY ASIATIC SOCIETY'S ROOMS,

27th December, 1843.

To

The Secretary Literary Society,

Madras.

SIR,

With reference to my letter, dated 7th September last, I have the honor to inform you that a copy of Izashni or Yaçna, and the Vispard, enclosed in the same parcel with the Vândidád, have been this day shipped on board the *Royal Saxon*, Captain James Crawford, to your address, for presentation to the Literary Society of Madras. The same parcel also contains two copies of the late Dr. Forbes' Paper on the Nature and History of Plague in the North Western Provinces of India, from myself, of which I have to request the Society's acceptance of one, and that the other be presented to the Medical Society.

I regret that so much delay should have taken place in the transmission of the Vândidád, to the cause of which it is not now requisite to advert.

I have the honor to be, &c.

(Signed) JOHN G. MALCOLMSON,

Secretary B. B. R. A. S.

Resolved,—That the Society's thanks be conveyed to the Secretary, J. G. Malcolmson, Esq., for the same.

Read a letter from the Secretary to Government, dated 5th January, 1844, transmitting a copy of a printed Report on the Honorable Company's Botanic Gardens, Calcutta.

FORT ST. GEORGE, *5th January*, 1845.

No. 27.

To

The Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society.

GENTLEMEN,

Public Department. I am directed by the Most Noble the Governor in Council to transmit to you copy of a printed Report on the Honorable Company's Botanic Gardens, Calcutta, received from the Government of Bengal.

I have, &c.

(Signed) J. F. THOMAS,
Secretary to Government.

Resolved,—That in acknowledging the receipt of this work, the respectful thanks of the Society be conveyed to the Most Noble the Governor in Council for the same.

The Secretary lays before the Meeting several letters received from the Society's Booksellers, advising the dispatch of Books and Magazines.

Life, Writings, and Inventions of Dr. Cartwright.
Barrow's Life of Sir F. Drake.
Gally Knight on the early Architecture of Italy.
Ranke's History of the Reformation, translated by Miss Austin.
Ireland and its Rulers since 1829.
English Universities by Huber, translated by Newman.
Travels of Marco Polo, edited by Marsden, second-hand copy; and Brewster's Edinburgh Journal, No. 18, in 1828, containing Lord Oxmantown's Experiments on Specula, or the number containing that Paper; and Coddington's Optics I. Refraction-Reflexion II. and Eye and Optical Instruments for Captain Worster.

(Signed) J. MINCHIN,
Secretary M. L. S. &c.

At an Annual General Meeting of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held at the Society's Rooms, at the College, on Tuesday, the 23d January, 1844.

The Honorable Sir E. GAMBIER, President, in the Chair.

The Secretary submitted to the meeting an abstract statement of the funds of the Society for the past year, exhibiting a balance in its favor of Rupees 1,100 11 4.

The following donations having been made to the Society since the last annual general meeting, the thanks of the Society were unanimously voted to the donors.

Lieut. Eastwick's Vocabulary of the Sindi language, by the author.

Knox's Giotto and Francesca and other poems, by the Rev. G. Knox.

Printed Report on the Honorable Company's Botanic Gardens, Calcutta, by the Madras Government.

A lithographed copy in 2 vols. of the Vándidád, in the Zand language, but Guzarathi character, with a Guzarathi translation, paraphrase, and comment, by Aspandiarji Framji and other learned Dasturs of the Kadmi sect of Parsis, by the Bombay Branch of the Royal Asiatic Society.

Dr. Forbes' Papers on the Nature and History of the Plague in the North West Provinces of India, by J. G. Malcolmson, Esq.

It was announced to the meeting that the following gentlemen have been elected Members of the Society since the last annual general meeting.

Lieut. Col. P. Montgomerie, C. B.
Hon'ble H. Chamier, Esq.
W. H. Rose, Esq.
W. A. Serle, Esq.
Rev. E. Whitehead, A. M.
S. D. Birch, Esq.
B. Cunliffe, Esq.
Captain G. Halpin,
T. S. Smyth, Esq.
J. R. Boyson, Esq.

During the last year the Society has lost four Members by death, retirement, or departure for Europe.

Read a letter from Captain T. J. Newbold, dated 25th December, 1843, forwarding for presentation to the Society a specimen of sulphate of barytes from the Nullamulla Hills. The thanks of the meeting were unanimously voted to Captain Newbold for the same, and his valuable paper which accompanied it, containing an interesting geographical description of the locality from whence the mineral was procured, is referred to the Committee with a view to its being published in the next number of the Society's Journal.

[Published in No. 30.]

Mr. Walter Elliot exhibits to the meeting some ancient remains of Greek pottery received from Captain Cunningham, 23d N. I.

[Figured and described in No. 30 of the Journal.]

On the motion of J. Minchin, Esq. and seconded by B. Cunliffe, Esq., J. U. Ellis, Esq. and M. Lewin, Esq. were duly elected Members of the Managing Committee for the ensuing year, in the room of J. B. Norton, Esq. and Lieut. Col. Felix, who have retired, and the following gentlemen were unanimously re-elected Members of the Committee.

Captain S. Best,	Walter Elliot, Esq.
R. W. Chatfield, Esq.	Lord Arthur Hay,
R. Cole, Esq.	Rev. G. Knox,
J. Dent, Esq.	J. C. Morris, Esq., and

Captain W. K. Worster.

At a Meeting of the Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held on Wednesday, the 21st February, 1844.

The Secretary lays before the meeting two letters received from the Society's Booksellers.

Resolved,—That a Sub-Committee be appointed, consisting of Messrs. J. C. Morris, Walter Elliot, and R. Cole, for determining on the papers to be published in the Society's Journal, and for forwarding the publication of the same.

The Secretary having brought to the notice of the meeting, that the expense in forwarding by post to Captain Newbold the Inscriptions belonging to him would be considerable;

It is resolved,—That the Chief Secretary to Government be requested to frank the parcels containing the Inscriptions for transmission to Captain Newbold.

Read the following letter from the Rev. W. Taylor, dated 19th February, 1844.

To

The Secretary Madras Literary Society.

&c. &c. &c.

Sir,

I have the honor to forward by desire of Rev. H. Gundert of Tellicherry, a Lithographic copy of his Digest of the *Kerala Ulpatti*, a well known historical work in the Malayalam language, for the acceptance of the Madras Literary Society. An extract from his letter to me of 8th

August, 1843, accompanies an explanation, and I shall be happy to transmit copy of his somewhat fuller analysis of the work, should such be deemed desirable.

MADRAS, Pursewaukum, *February* 19*th*, 1844.

I have the honor to be, &c.
(Signed) W. TAYLOR, *Missionary.*

EXTRACT.

"The ground on which I take this freedom is your having laid me under real obligations in your reports of the Mackenzie MSS. which first led me to search for Malayalam historical manuscripts. I obtained in the course of these four years above a dozen of such, and tried to restore the original text, at least in those parts which merited the attention of an European—much that is not original, deserved in my opinion to be preserved in brackets, either for the elucidation of portions treated too briefly, or in order to make the manuscript, by variety of style, more interesting to the student of the language. The result has been this little compilation.

"(Signed) H. GUNDERT."

Resolved,—That in communicating the thanks of the Society to the Rev. H. Gundert for the same, he be informed that the Society would feel much obliged to him for his analysis of the work.

At a Meeting of the Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held on Friday evening, the 22*d March*, 1844.

Read the following letter from the Rev. W. Taylor, dated 22d February, 1844, transmitting at the suggestion and request of Walter Elliot, Esq., a paper on some Malayalam inscriptions by the Rev. H. Gundert.

To

The Secretary Madras Literary Society.
&c. &c. &c.

SIR,

At the suggestion and request of Walter Elliot, Esq., I have the honor to transmit to you the accompanying paper on some Malayalam antiquities by the Rev. H. Gundert of Tellicherry, received by me from him last month, with his letter to me dated 2d ultimo, giving me permission to make the present use of the paper, if I thought proper, after it had been seen by Mr. Elliot.

I allow a few pencilled notes of mine to remain in the margin. I had once intended to found on them a few written annotations, but on considering that they would not lead to any important conclusion, I prefer allowing the Editor of the forthcoming Journal to make use of them, if he may think proper to do so.

I have the honor to be, &c.

PURSEWAUKUM, *February* 22*d*, 1844. (Signed) W. TAYLOR, *Missionary.*

Resolved,—That it be referred to the Sub-Committee of Papers.

[Printed in No. 30 of the Journal.]

Read the following letter from Captain T. J. Newbold, dated Kurnool, 24th February, 1844.

Kurnool, February 24*th*, 1844.

MY DEAR MR. MINCHIN,

I should be very much obliged if you could allow me the use for a few days of the following books from the Library at the College, viz. DeLambre's Histoire del' Astronomie Ancienne, Asiatic Researches, Vols. II. and IX.

If they can be spared, please tell Mr. Bantleman to send them to Griffiths, who will forward them to me by cooly—they shall be returned by the same cooly—I only require to make a reference.

I sent the Madras Society lately a specimen of some interesting Foraminifera found in the chert and jasper of the diamond limestone, which I trust has been received and placed with the rest of the specimens in your museum. I have sent specimens to my friend Col. Sykes, and to Lonsdale, late Secretary Geological Society, to be examined. The Madras Society shall have the result as soon as communicated.

Has the Society come to any determination anent the Mackenzie MSS. in the Library at the East India House?

I presume there is no hope of a Museum of Economic Geology being formed at Madras.

(Signed) T. J. NEWBOLD.

Read the following letter from the Secretary to Government, dated 2d March, 1844.

No. 212.

To

The Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society.

GENTLEMEN,

Public Dept. I am directed by the Most Noble the Governor in Council to draw your attention to the communications from this Department, of

1st November, 1841. No. 952. 23d March, 1843. No. 264.

the dates noted in the margin, and to request that you will supply the information therein solicited, and furnish the specimens of the porcelain clay, and of the deposit containing fossils required by the Government of India.

I have the honor to be, &c.

FORT ST. GEORGE, *2d March*, 1844.

(Signed) J. F. THOMAS, *Secretary to Government.*

Resolved,—That the Sub-Committee be requested to prepare a report for submission to Government.

Read a letter from R. W. Chatfield, Esq., dated 15th March, 1844. Stating that he has been nominated to a situation in the Mofussil, and regrets therefore the necessity of being obliged to resign his post as a Member of the Committee.

Resolved,—That the following works be ordered out from England for the Society.

Professor Forbes' Work on Glaciers.

The Linnæan Translations; and to make inquiries for a set of the early volumes.

That with reference to the Resolution of the 21st February last, the British Critic be again ordered.

Proposed by J. Dent, Esq., and seconded by the Rev. G. Knox.

That no order or standing Rule of the Committee be rescinded or altered without a month's previous notice.

Two letters received from the Society's Booksellers, dated 30th and 31st January, 1844, are also laid before the Meeting.

Read a letter from John Sullivan, Esq., dated 2d February, 1844, stating that he had taken steps for replacing the missing volumes of Buffon and Montesquieu.

Proposed that Messrs. Morris, Knox, and Worster, be formed into a Sub-Committee for the purpose of improving the circulation of the periodical publications.

At a Meeting of the Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held on Monday evening, the 22d April, 1844.

Read the following letter from the Secretary to Government, dated 30th March, 1844.

To

The Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society in London.

GENTLEMEN,

Public Dept. dated 10th Nov., 1843.

In acknowledging the receipt of your Secretary's communication on the subject of the formation of a Museum of Economic Geology at this Presidency, I am desired to inform you, that the Government have resolved to submit the proposition for the consideration of the Honorable the Court of Directors.

I have the honor to be, &c.

FORT ST. GEORGE, *30th March*, 1844.

(Signed) J. F. THOMAS, *Secretary to Government.*

The Secretary lays before the Meeting a letter from the Society's Booksellers, dated 29th February, 1844.

Resolved,—That the following works be purchased for the Society in order to complete the Society's copies.

The London, Edinburgh and Dublin Philosophical Magazine, from May, 1842.

Asiatic Researches, Volume 16th, and those published after the 18th.

Journal of the Asiatic Society of Bengal, several odd Numbers.

Journal of the Royal Asiatic Society of Great Britain and Ireland, from No. 14.

Resolved,—That the Athenæum, Literary Gazette, and Examiner, be kept only three days by each Member of the Committee.

Mr. Walter Elliot in the name and at the desire of Lord Arthur Hay, lays on the Table a Copy of Wilson's and Buonoparte's Illustrations of American Ornithology, in Folio, with coloured plates. By Captain Thomas Brown.

Resolved,—That the thanks of the Society be presented to Lord Arthur Hay, for his munificent gift.

At a Meeting of the Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held on Saturday evening, the 8th June, 1844.

Read the following communication from the Secretary to Government in reply to the application of the Society of the 23d September last.

PUBLIC DEPARTMENT.
No. 435.

Extract from the Minutes of Consultation, dated 3d May, 1844.

Ordered that a copy of this dispatch be furnished to the Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society in London, with reference to their Secretary's letter of the 23d September, 1843.

No. 6, of 1844.

Our Governor in Council at Fort St. George.

1. We now reply to your letter in this department, dated the 12th October, No. 22, of 1843, para. 2, in which you have forwarded a communication from the Madras Literary Society and Auxiliary of the Royal Asiatic Society of London, suggesting the transmission to that Presidency of a number of manuscripts in the languages of Southern India, now in our Library, and believed to form the most valuable part of the collection of the late Colonel Colin Mackenzie, for the purpose of having translations of the most interesting of them effected, under the supervision of the Society, and published, either in their own Journal, or in that of the Parent Society.

2. The Society is in error in supposing that the manuscripts in question, ever formed part of the Mackenzie collection. Such of the manuscripts, collected by Colonel Mackenzie, as were original statements, and reports, were sent from Calcutta to Madras, many years ago; such manuscripts as belonged to the literature of the Deckhin were catalogued, and described by Professor Wilson, with the assistance of the Natives on Colonel Mackenzie's establishment, and are in our Library, but they are not the books intended. The manuscripts, to which the application refers, are those which were partly catalogued by Mr. C. P. Brown, of the Madras Civil Service, when in England, as stated by him in the note, accompanying the letter from the Secretary to the Literary Society of Madras, and were collected chiefly by the late Dr. Leyden, whose Oriental Manuscripts were purchased by the Company. They are written in the languages and characters, current in the South of India, and have been only imperfectly catalogued, many of them being ill written, in bad condition, and not easily decyphered, even by European Scholars, acquainted with the languages in which they are composed.

3. As also proficiency in the Tamil, Canarese, and Telugu languages, is not common in this country; and manuscripts in those languages rarely find readers, if there be any thing of value in the works, it will be dis-

covered only at Madras, where Native assistants are to be had. We therefore accede to the application of the Society, and shall transmit the entire collection, on condition, that should any descriptive account or translations of them be prepared, copies of such descriptions or translations be sent for our Library.

We are, &c.

LONDON, 6th March, 1844. (Signed) JOHN COTTON, JOHN SHEPHERD, &c. &c.

(True copy and extract.)

(Signed) J. F. THOMAS,
Secretary to Government.

Read a letter from Messrs. Wm. H. Allen and Co., dated 6th April, 1844, advising the despatch of a case of books per *Mellish.*

Resolved, with reference to the mistake of the Booksellers in sending out the original large work of Ehrenberg instead of the smaller English edition ordered; and observing that the letter of 12th December, 1843, does not specify the Committee's order with sufficient clearness—That hereafter the Meetings of Committee be fixed at an earlier date than at present, so as to allow of all drafts being circulated and passed by the Members before despatch.

Read the following letter from Captain T. J. Newbold, dated 19th May, 1844.

To

The Secretary M. B. Royal Asiatic Society.

SIR,

I have the honor to request you will have the goodness to return my best thanks to the Society for permitting me the use of the books named in your letter of the 2d ultimo, now under acknowledgment; and also for the 24 Nos. of the Society's Journal, which I conclude are for Mr. Garcin de Tassy; and which if I do not hear from you otherwise, regarding their disposal, I shall forward to him.

I have also to express to the Society the gratification and pride I have experienced in receiving its thanks and approbation, as expressed in your letters of the 25th August, 1843, and 27th February, 1844.

I have the honor to forward for presentation to the Museum, specimen of jasper and chert imbedding foraminifera, and also two small specimens of coal from Kotah, about 10 miles up the Panheeta river above its confluence with the Godavery. It occurs as a vein in the argillaceous limestone associated with the sandstone dipping at a low angle to the N. E. It is curious as being the only specimen of a coal vein in this part

of India occurring in limestone—eighty-five miles N. W. of this locality, anthracite occurs, in the sandstone of Duntumnapilly, in a bed 200 feet long and with a maximum breadth of 3 feet.

The present specimen though lamellar in structure, I find to be clearly distinguished from anthracite by inferiority in specific gravity, greater softness, absence of all metallic lustre, and containing bitumen.

It is distinguished from lignite by not presenting traces of vegetable, fibre, or organic structure; its emitting a coal-like (instead of a pitch-like) odour when burnt. Its structure is lamellar; fracture slaty; tough; hardness between 1 and 2, Mohs; opaque; lustre dull; colour grayish black and brownish black; touch rather meagre; odour slightly bituminous; streak brownish black; specific gravity from 1.154 to 1.260.

It contains 49 per cent. of volatile matter (Derbyshire Cannel coal contains 47); the residue I found chiefly carbon, silica, iron, and a little carbonate of lime derived doubtless from its matrix.

It burns briskly with considerable flame and smoke and coal-like odour, leaving a softish gray ash.

It is evidently neither an anthracite nor a lignite, and may be classed as "slate-coal."

Dr. Walker of the Nizam's Service, has the merit of discovering its site, and to him I am indebted for the specimens I examined.

KURNOOL,
May 19*th*, 1844.

I have the honor to be, &c.
(Signed) T. J. NEWBOLD.

Resolved,—That the thanks of the Society be given to Captain Newbold for the above.

Read a letter from the Secretary to the Asiatic Society of Calcutta, stating that the Society can furnish Vols. 16, 19, and 20 of its transactions, and Nos. 25 and 26 of its Journal, for Rupees 34, the earlier numbers of the latter being out of print are not procurable. Recorded.

Resolved,—That the following works be ordered out from England for the Society.

Loudon's Encyclopædia of Trees and Shrubs, £2-10.
Loudon's Encyclopædia of Agriculture, £2-10.
Loudon's Encyclopædia of Plants, £3-13-6.
Loudon's Encyclopædia of Cottage, Farm, and Architecture, £3-3.
Southey's Life of Nelson.

Resolved,—That the Booksellers be requested to ascertain and report at what cost the Society's set of the Philosophical transactions can be completed—they now possess from 1818 to 1839, the first part of 1821 is wanting.

Likewise that they be requested to endeavour to dispose of the copy of Ehrenberg's Infusioria, despatched by the *Mellish*, which was ordered by mistake instead of *Prichard's Account* of Ehrenberg's Discoveries, and which, in the event of the other being sold, they would desire to have sent out.

Resolved,—That Mr. Bantleman be authorized to bid at Miller's sale of Books, on Monday next, for lot No. 10 as far as ten Rupees, and lot 27 (Eusebii Opera) as far as fifteen or twenty Rupees.

Mr. Walter Elliot laid a letter from Mr. Pharoah before the Committee, complaining that the publication of the Journal had been given to another Press; and stated that he had informed Mr. Pharoah in reply, that the Committee having invited tenders for the publication from the principal presses, including Mr. Pharoah's, had accepted the lowest.

Mr. Walter Elliot read a letter from Mr. R. Clarke forwarded by Captain Newbold, in which he says that no communication had been received by the Royal Asiatic Society on the subject of the Mackenzie MSS. Captain Newbold proposes that an application should be made for those in the Southern dialects to be sent out to the Madras branch for examination and translation.

Ordered to be discussed at the next meeting.

At a Meeting of the Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held on Saturday evening, the 6th July, 1844.

Read a letter from Messrs. Wm. H. Allen and Co., dated 13th April, 1844, advising the despatch of books per *Samarang*.

Read the following letter from the Secretary to Government, dated 11th June, 1844.

To

The Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society.

Sir,

Public Dept. I am directed by the Most Noble the Governor in Council, to transmit to you the accompanying copy of the Madras Meteorological Observations recently published at this Presidency.

Fort St. George, 11*th June*, 1844.

I have the honor to be, &c.

(Signed) J. F. Thomas,
Secretary to Government.

Resolved,—That the thanks of the Society be offered for the same.

Read the following letter from Captain T. J. Newbold, dated Kurnool, 15th June, 1844. Presenting to the Society specimens of a recent fresh water fossil deposit from the vicinity of Hungabunda, Kurnool territory, and also a few from a somewhat similar deposit near the Mudaletty temple on its southern border, with the Banganpillay jaghire.

Resolved,—That the thanks of the Society be conveyed to Captain Newbold, for the above specimens.

Read the following letter from the Secretary of the Mathematico-physical Class of the Royal Academy of Bavaria, dated Freyberg, 15th March, 1844.

Academia Literarum et Scientiarum regia Monacensis ad Academiam quae dicitur. "Literary and Philosophical Society of Madras."

Cum academia nostra non solùm suis ipsa viribus, quantum fieri potest, solidae doctrinæ terminos promovere, sed etiam ea omnia accurate cognoscere, et in usus suos convertere studeat, quæ ab aliis academiis in diversis litterarum et scientiarum provinciis inveniuntur, aut jam inventa excoluntur et ornantur, in conventu suo decrevit, ut numerus exterarum academiarum, quibuscum talem studiorum communionem jam inivimus accessione earum augeatur, ex quarum consortio fructus, qui e tali societate nasci solent, largiores et optabiliores expectare potest.

Itaque academiam vestram quae in saluberrimo litteras et scientias promovendi studio insignem locum obtinet, ad hanc societatem nobiscum in eundam invitamus. Quod si gratum fuisse audiverimus, mittentur ad eam, ex libris academia nostra editis, omnes illi, quos ei gratas fore cognoverimus: simulque omnes qui in posterum edentur, petimusque, ut item nobis academia vestra praestare velit in libris qui ab ipsa publicati sunt, aut in posterum publicantur.

Libri nobis destinati commodissime ad academiam nostram pervenient, si per librarios mittentur, quorum nomen his litteris subjunximus.

VALETE,
Monachium, 15 *Martii*, 1844.
Freyberg.

SIR,

I have the honor of adding to the letter above of the President of the Royal Bavarian Academy, that being charged with the foreign correspondence, I should be exceedingly gratified by receiving a detailed instruction how a regular correspondence between the Madras Society and our Academy is to be conducted. Letters may perhaps be sent on the most convenient way overland, directing them to the British Consul at Trieste. Communications of a greater extent will find their expedition

at London, if directed to Mr. W. Pamplin, Junior, Queen Street, Soho 9; this person being the Academy's Commissioner for Great Britain, and ready also to take under his care the parcels which are destined for your Society. Being favored with your kind reply, I shall direct to you the Almanac of our Academy, from which you may choose those of our publications which you find convenient. On the other side we shall be exceedingly happy to receive a complete set of your publication.

Allow me to express that I expect to derive much instruction and enjoyment from such a mutual intercourse with your illustrious Society, and that I shall be happy to be serviceable to it.

Believe me, with high respect, Sir,
Your most obedient humble servant,
(Signed) D. V. Martius,
Secretary of the Mathematico-physical Class of the Royal Academy of Bavaria.

Munich,
14*th March*, 1844.

Read a letter from the Secretary to Government, dated 29th June, 1844.

To

The Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society.

Gentlemen,

Public Department.

I am directed by the Most Noble the Governor in Council, to transmit to you the accompanying copy of the 6th volume of the Madras Astronomical Observations, recently published at this Presidency.

I have the honor to be, &c.
(Signed) J. F. Thomas,
Secretary to Government.

Fort St. George,
29*th June*, 1844.

Resolved,—That the thanks of the Society be returned for the same.

Read a letter from J. Western, Esq., dated 22d June, 1844, forwarding a list of new works, and complaining of a paucity of books of light reading in circulation, which was taken into consideration.

Mr. Elliot having brought to the notice of the Committee, that the wall concealing the inscription in the Varaha Swami Temple at the Seven Pagodas, mentioned by Dr. Babington in the Transactions of the Royal Asiatic Society, Vol. II. p. 263; and for removing which the Pujaris formerly asked an exorbitant sum, might now be taken down and rebuilt for 30 Rupees.

Resolved,—That this sum be raised by a subscription of 3 Rupees each by the Members of the Committee, for the purpose of laying open and copying the inscription.

With reference to the subject brought forward at the last meeting on Captain Newbold's letter, forwarding a communication from Mr. Richard Clarke, Secretary Royal Asiatic Society, regarding the Mackenzie MSS.

Resolved,—That the Secretary be requested to address the Secretary of the Royal Asiatic Society on the subject of the Mackenzie MSS.

At a Meeting of the Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held on Tuesday evening, the 13*th August,* 1844.

The Secretary lays before the Meeting the following letter drawn up by the Rev. G. Knox, in reply to the President of the Munich Academy.

Societas Literarum et Scientiarum Madrasensis, ad Academiam Literarum et Scientiarum Monacensem.

Libentissime legimus literas vestras ex quibus facile intelleximus quam acri ac strenuo animo societas vestra in scientiæ pervestigatione atque in omni varietate literarum versata sit. Quapropter nobis gratissimum fecistis quod et societatem nostram in adjutorum vestrum numerum cooptare decreveristis.

Veremur tamen ut quam minime existimationi vestræ satisfacere possimus; neque nobis in æstu rerum publicarum assidue laborantibus fructus otii datus est ad bonas artes promovendas inter nosque recolendas.

Paucis tamen pro viribus operam dedimus quæ ad annales, quæ ad literas, quæ ad mores, quæ denique ad regiones Indorum spectant; hæc omnia in Diarium nostrum conferre solemus.

Vobis igitur hujus Diarii exemplar, quam absolutissimum per librarios vestros transmittere curavimus; hoc munusculum, pignus benevolentiæ, officiorum mutuorum primitias esse volumus.

Quodsi e cætu literatorum vestrûm sint qui rerum Orientalium studiosi, in his rebus explicandis auxilio indigeant, quod nobis in his Orientis partibus commorantibus, præsto afferendum sit, nihil gratius facere nobis poterunt, quam ut studia hæc cum nobis communicent. Itaque ut faciant etiam atque etiam rogamus.

VALETE. MADRAS.

Read the following letter from H. Piddington, Esq., Sub-Secretary of the Asiatic Society, dated 12th July, 1844—forwarding a Bill of Lading for a parcel of books transmitted to the Society per Steamer. Recorded.

Resolved,—That the following works be ordered out from England for the Society:—

The Public and Private Life of Lord Chancellor Eldon, by Horace Twiss, Esq.

Narrative of a Voyage of Discovery and Research in the Southern and Antarctic Seas, by Captain Sir James Ross.

Life of the late Lord Hill, by the Rev: Edward Sidney.

Lord Mahon's History of England.

History of England under the Anglo-Saxon Kings, from the German of Lappenberg, by B. Thorpe Murray.

History of Painting in Italy, from the German of Kugler—Edited by Eastlake.

Brummell's Memoirs.

Churchill's Poems, by Tooke Pickering.

Adair's Memoirs of the Court of Vienna.

Biographical Dictionary of the Society of Useful Knowledge.

Sir C. Bell's Anatomy of Expression.

Lady Willoughby's Diary.

Western Barbary, by J. H. Drummond Hay.

Seventh Report of the Massachussett's Board of Education, by H. Mann.

The Young Student, by Mad. Guizot.

Siborne's Battle of Waterloo.

Sir Walter Scott's Poetical Works, a good second-hand copy.

The Calcutta Review, to be procured from Bengal.

Resolved,—That a Circular embodying the four first pages of the Society's Catalogue be printed, inviting gentlemen to become Members of the Society.

Mr. Thorpe's account for printing the 30th Number of the Society's Journal is laid on the table.

Resolved,—That Mr. Bantleman be requested to take steps for collecting the subscriptions on account of the Society's Journal.

Mr. Walter Elliot reads the following extract of a letter from Captain T. J. Newbold, requesting the aid of any Member of the Committee in preparing a magnified drawing of the fossil foraminifera.

"That the subject of Indian Geology is gaining ground is evident. A few days ago, I received a letter from General Fraser, enclosing me some queries from General Briggs, viséd, by De la Beche and Phillips, regarding the existence of boulders in S. India, which I have answered to the best of my ability. The supposed boulders in the vicinity of Hyderabad and Puttuncherroo, (mentioned by Brongniart on the authority of De Luc, I think,) I examined particularly several years ago, and found them of granite, similar to the granite on which they reposed, and therefore *not* boulders in the geological sense of the term. Their rolled appearance is

owing to a process of concentric exfoliation, I have described elsewhere. True erratic boulders, *like those I have* seen in the North of England, *I have never met within India*, and looked for them in vain on the shores of the Red Sea, Mediterranean, in Egypt, and Arabia Petræa. Their absence in these regions, tropical and sub-tropical, tends to corroborate the theory of floating ice-bergs, having been mainly instrumental in the transport of the vast masses of debris, and vast erratic blocks we see in the northern parts of Europe. It is well known that the usual course taken by ice-bergs from the confines of the Polar circles of eternal congelation is towards the temperate latitudes, and that they dissolve and discharge their burthen of earthy and rocky debris, long before they can arrive at the hot regions of the equator. Hence this comparative rarity of the boulder formation in warm countries. Passing south of the equator, we again find the boulder formation, in the cold regions of Chili and Patagonia. We may find drift pebbles, here and there resting on rocks of a different description in S. India, but as far as my observation extends, true boulder beds, similar to those of N. Europe and the more southerly latitudes of America, do not exist either here or in those parts of Egypt and Arabia, which I have visited. However as the observations of a single individual are not to be supposed as sufficient to disprove the possibility of such formations existing in S. India, and in order to carry out General Briggs' wishes to the utmost, I have enclosed the copy of his queries and remarks for submission to our Physical Committee, or the Society at large, requesting that they would have the kindness to communicate any information in their power on this interesting subject, either directly to General Briggs, General Fraser, or to myself. Would you kindly submit them through the usual channel for the remarks of the Committee.

"Mr. Piddington, I perceive, No. 61 of the Bengal Journal Proceedings Asiatic Society, January, 1844, p. 6, has at once pronounced the organic bodies in the diamond limestone interstratified cherts nummulites. I ventured only so far as to class them among Foraminifera, and this *still* with hesitation. I sent a specimen up to General Fraser requesting he would apply his powerful microscope to the elucidation of their structure. The enclosed drawing is the result. It will be seen that the convolute cavity, divided into cells spirally arranged of the nummulite is by no means clearly shown. Perhaps the septa dividing the cells may be more distinct in the specimens I have forwarded to the Society and to yourself. Would you kindly submit them with the drawing to the Society, or the Committee, with the request that any Member possessing a good microscope will examine and give a faithful drawing of the interior structure of the best de-

fined of these curious bodies. He will find the interior structure of the nummulite described in Sowerby's Mineral Conchology in the Library.*

Oriental Club, London, 26th March, 1844.

My Dear Fraser,

It is many, many years since we met, but it is unlikely that you should have either so entirely lost sight of me, that all recollection of me or of my career should have entirely escaped you.

The subject of the accompanying Memorandum, of which I send you a few copies, has excited considerable interest in this quarter of the world. Wherever boulders have been found in Europe, they have been considered as productions foreign to the localities where they now exist; and they are by some believed to have been brought to their present situation by ice-bergs, while the land was still submerged below the ocean; while others ascribe them to the ordinary consequence of rolled masses of rock hurried along by the force of aqueous currents. The glacial theory has in Europe many converts; but such a theory, to which I among others do not yield my assent, must be shaken if we should find that the boulders in India present the same peculiarities as those of Europe, namely, as to shape and difference of geological structure from any very contiguous rocks or hills.

General Morrison, with whom I was speaking on this subject three nights ago, conceives the boulders to be mere detached or fallen pieces of contiguous hills, which have assumed their present shapes from the effects of climate. To adopt this opinion, we must first have proof of the construction of the boulders, and any contiguous rocks being identical (and of which specimens alone can show); and also it must be demonstrated that the elements acting on sharp masses will have the effect of rendering them round (as if they had been submitted to rotatory attrition.) I have no theory on the subject, but we want well attested facts from eye-witnesses, with their opinions if they choose to give them, to enable geologists in Europe to come to some more satisfactory conclusion than has, I think, yet been arrived at.

I am not aware whether among your other scientific pursuits, you have included geology as one of them; but this I feel certain that whenever

* These when examined under a very powerful microscope by a member of the Committee (Captain Worster) proved to be nothing more than minute spherical bodies composed of concentric lamellar coats formed round a nucleus in the centre. Several specimens of the chert were ground down, so as to give sections of them in every possible direction, and they uniformly presented the same series of four or five concentric rings, without any appearance of organic structure whatever. Drawings of these were forwarded to Captain Newbold.

the promotion of science is concerned, in whatever shape you as a disciple of the school will be willing to lend your aid in the attainment and diffusion of knowledge. My relative, John Bird, now in Council at Madras, or Mr. Malcolmson, of the house of Forbes and Co., of Bombay, will receive and forward to me any little box or boxes of specimens, according to the Memorandum which you may be able to make up for me.

I am, &c.

(Signed) JOHN BRIGGS.

Memorandum drawn up by Major General Briggs, and submitted for approval to Sir H. De la Beche, F. R. S. and F. G. S., and John Phillips, Esq., F. R. S. and F. G. S., Professor of Geology in the Royal Institution of London and University of Dublin.

BOULDERS IN THE PENINSULA OF INDIA.

The occurrence in various parts of the globe of large rounded isolated blocks of rock, denominated boulders, has excited much interest, and has given rise to more than one theory among geologists as to the cause of their form, and their actual position.

These boulders exist in several localities in the Peninsula of India, either lying singly or in heaps, and are often found superposed one on another, without the intervention of any medium of connexion. Again, they are discovered cropping out from underneath the surface, and are not unfrequently met with (in digging for wells) several feet below the earth, but in all cases detached from any other rock.

They are to be seen at Puttencheroo, a town a few miles north of Hyderabad; at the latter place they abound in great quantities for several miles around that city; again at Muktul, on the road to the Ceded Districts, wherein they are also found; and they may be traced through several places in Mysore, especially at Bangalore and its vicinity.

Every information regarding the existence of these boulders, whether as to their size, their form, their geological structure, their situation, and their vicinity to any hills of similar structure, is of great interest. Hand specimens of the boulders and of the adjacent rocks, each marked separately, are desirable, and any geological description of the locality would be valuable; but as the latter desideratum can only be furnished by a competent geologist, it is neither to be expected, nor is it essential.

The specimens should be about two inches cube, which, with the required information might be packed in a small flat box, and sent to the Presidency by an early opportunity.

The date and place, with the name of the contributor of the information, are important to guarantee authenticity.

Resolved.—That Members of the Society who may be able and willing to communicate information on these points, be requested to forward it to the Secretary.

The Rev. G. Knox proposes that a Sub-Committee be nominated to see that Rule XIII. be duly carried out.

Mr. Knox offers himself to undertake this task.

At a Special General Meeting of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held at the Society's Rooms, at the College, on Thursday, the 3d October, 1844.

The Secretary read the following letter from C. P. Brown, Esq., dated 28th September, 1844.

My Dear Mr. Minchin,

You may remember that about three years ago, I prepared a list of the Manuscripts in the Literary Society Library. The books now received from Government, form part of the same collection: and I would suggest that both parts should be deposited together in the College Library, the whole being Government property. If you think there is no objection to this, I will make the arrangement, with a view to framing one complete list. Otherwise we shall occasionally find one volume of a book in one Library, and a second in another.

Your's very sincerely,

28*th September*, 1844. (Signed) C. P. Brown.

The Secretary then stated that the object for convening the present Meeting was to elect a Member for the Managing Committee in the room of R. W. Chatfield, Esq., who has left the Presidency.

It was then proposed by Walter Elliot, Esq., and seconded by the Rev. G. Knox.

That J. Ouchterlony, Esq. be elected a Member of the Managing Committee—carried unanimously.

The Meeting then adopted the following propositions:—

Proposed by Walter Elliot, Esq., and seconded by J. Shaw, Esq.

That it be referred to the Committee to report on the best mode for new modelling the system of circulating the Periodicals amongst the Subscribers—carried unanimously.

Proposed by W. A. Serle, Esq., and seconded by T. S. Smyth, Esq., and the Rev. G. Knox.

That the President and Vice Presidents be considered as ex-officio Members of the Committee—carried unanimously.

Proposed by J. Shaw, Esq., that three numbers of the *Athenæum* and *Literary Gazette* be ordered; but on the suggestion of Sir E. Gambier, this motion was withdrawn; Dr. Shaw requesting that it might be taken into consideration by the Committee.

Proposed by T. S. Smyth, Esq., and seconded by Captain Cramer.

That it be referred to the Committee to consider whether the proportion of modern Novels by the less established authors might not be advantageously reduced—carried unanimously.

Proposed by Walter Elliot, Esq., and seconded by G. Harding, Esq., and W. A. Serle, Esq.

That special Meetings shall only be summoned by order of the President, either by request of the Committee of Management, communicated through the Secretary, or by a written requisition of not less than ten Subscribers; that the object or objects for which such Meeting is called, be specified in the notice, and that the business of the Meeting be strictly confined thereto—carried unanimously.

The business of the Meeting being concluded, the thanks of the Meeting were unanimously voted to the Honorable the President.

At a Meeting of the Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held on Monday evening, the 21st October, 1844.

Read the following letter from Mr. G. De Tassy, dated Paris, 9th August, 1844.

9 *Avril*, 1844.

Monsieur,

J'ai eu l'honneur de recevoir, votre lettre du 20 Fevrier passé et je vous remercie et vous prie de faire agréer, a la Societé Litteraire a Madras, mes remerciments empressés pour les 2 volumes de Mille et une nuits en Hindostani qu'elle a bien voulu m'accorder.

J'ai l'honneur de remercier aussi d'une maniere particuliere, Mr. Walter Elliot, pour les trois exemplaires qu'il veut bien m'envoyer en m'autorisant d'en faire cadeau a mes amis amateurs dela litterature Hindostani Je me propose d'en offrir un exemplaire de sa part à l' institut Royal de France, et de reserver les deux autres pour des particuliers.

Je dois vous dire du reste que *je n'ai pas encore reçu*, cet envoi, et que je n'en ai aucune nouvelle; je me flatte néanmoins qu' il ne sera pas perdu.

Je prends la liberté de vous prier, instamment, de me procurer le *Catalogue Lithographé des manuscrits Persans et Hindostanis de la Bibliotheque de la Societé litteraire de Madras* (Branch of the Royal Asiatic Society.)

Il est impossible de la procurer en Europe, et il est pour moi de plus grand interet de la posséder.

Je desirerais bien avoir aussi un petit volume imprimé a Madras, en 1837, et intitulé; *a Digest of the different castes of India with an account of them by C. V. Ramasawmie.*

Je vous prie déxcuser mon indiscrétion, et d'agréer l'assurance du parfait devouement avec le quel j'ai l'honneur d'etre, Monsieur,

53 Rue St. André Desarts, Paris.

Votre trés humble serviteur,
(Signé) GARCIN DE TASSY.

Resolved,—That the books required by Mr. G. De Tassy, be procured and forwarded to him; but the Committee are not aware of the existence of the Catalogue referred to.

Read a letter from Messrs. Wm. H. Allen and Co., dated London, 2d August, 1844—acknowledging the receipt of the first of a set of bills for £ 100, and advising the despatch of the July and August periodicals per Steamer, through Messrs. Line and Co.

Read a letter from Captain T. J. Newbold, dated 9th August, 1844—presenting to the Society a few specimens from some caves in the limestone rocks of Billa Soorgum, Kurnool territory, among which is a gypseous bone breccia, a red indurated marl or mud resembling that of the celebrated Kirkdale caves in Yorkshire, and a few fossilized bones.

Resolved,—That the thanks of the Committee be given to him.

Read a letter from M. Annuntachary Bramin, dated 18th August, 1844—forwarding some Sanscrit verses in praise of the British Government.

Resolved,—That the thanks of the Committee be given to him.

Read the following letter from the Secretary to Government, dated 30th August, 1844.

Public Department.

No. 795.

Extract from the Minutes of Consultation, dated 30th August, 1844.

Read the following letter from the Acting Secretary to the Marine Board.

Requests instructions as to the disposal on their arrival from England, of the 11 cases of "Oriental Manuscripts, consigned to this Presidency, on the *Duke of Cornwall*," by the Honorable Court of Directors.

The Marine Board will be pleased to deliver to the Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society in London, the Oriental Manuscripts alluded to in the foregoing letter, on their arrival from England.

(A true Extract.)

(Signed) J. F. THOMAS,
Secretary to Government.

Read a letter from Captain J. Robertson, dated 3d September, 1844, stating that though a first class Subscriber, the *Literary Gazette* has never been forwarded to him.

Read a letter from T. S. Smith, Esq., dated 4th September, 1844—stating that his honor Mr. Justice Burton will have great pleasure in becoming one of the Vice Presidents of the Society.

Read a letter from Lieutenant Arthur Stevens, dated 5th September, 1844—forwarding at the request of Captain Cotton, some stones found on the hills near Kimedy, by Captain Glover.

Read a letter from J. Shaw, Esq., dated 18th September, 1844—requesting that the *Literary Gazette* and the *Athenæum* may hereafter be circulated to him, as the other periodicals.

Resolved, with reference to this communication and that from Captain Robertson,—That two copies of each of the above publications be ordered, and that both be circulated to the first class Members of the Society after their perusal by the Committee.

Read letters from R. Cole, Esq., dated 18th October, 1844, and M. Lewin, Esq., dated 21st October, 1844—tendering their resignations as Members of the Committee.

Resolved also,—That the following letter be addressed to the Secretary of the Munich Academy.

To

M. Von Martius,

Secretary of the Royal Academy of Bavaria.

Sir,

In acknowledging the receipt of your letter of the 14th March last, and in compliance with the request therein contained, I am instructed by the Managing Committee of the Madras Literary and Auxiliary of the Royal Asiatic Society, to inform you, that Messrs. W. H. Allen and Co., the Society's Booksellers, will be instructed to forward to your London Agent, Mr. W. Pamplin, Junior, a parcel for your Academy, containing, with the exceptions of Nos. 2, 3, 4, 12, and 13, which are out of print, all the other Numbers of the Madras Journal of Literature and Science. This channel, the Committee think, would best facilitate the interchange of communications between the Society and your Academy. I am also instructed to add that the Society would be happy to forward the views of your Academy in any manner in which it may require the Society's services. In conclusion, I beg to state that the Society would be happy to obtain a copy of your Almanac.

I have the honor to be, &c.

(Signed) J. Minchin,

Secretary M. L. Society, &c.

Madras,
21*st October*, 1844.

Resolved,—That the following books be ordered out from England, for the Society.

Diary and Correspondence of James Harris, first Earl of Malmsbury.
The Popular Member, by Mrs. Gore.
Home Scenes and Recollections, by Lady Chatterton.
Fanny Kemble's Poems.
Roman Traitor, by the author of "Oliver Cromwell."
Memoirs of Conquesbed a Berual Deaz, translated by J. L. Lockhart.
The Dark Ages, by the Rev. S. R. Maitland.
Correspondence of Edmund Burke, by E. Fitzwilliam, 4 vols.
Hyde Marston, by Craven.
Tarlton's Jests out of Purgatory, by J. O. Hallewell.
Life of W. Beckford.
Adventures of an Officer in the service of Runjeet Sing, Edited by Major Lawrence, Assistant to Political Agent at Luknow.
Mrs. Abell's Recollections of the Emperor Napoleon.
History of Partisan Corps, under Colonel Simcoe.
The Life and Times of Richard the 3d, by Miss Halstead.

At a Meeting of the Managing Committee of the Madras Literary Society, and Auxiliary of the Royal Asiatic Society, on Wednesday Evening, the 20th November, 1844.

Read a letter from Messrs. Wm. H. Allen and Co., dated London, 26th June, 1844—stating that they can procure for the Society a complete set, as far as 19 volumes, of the Linnæan Transactions, for £ 18 0 0.

Read a letter from the Secretary to Government, dated 1st November, 1844—transmitting a printed list of Desiderata of Medicinal Plants extracted from the Flora Medica of Dr. Lindley.

Resolved,—That the thanks of the Society be communicated to Government for the same.

That with reference to Captain Gill's Mission to proceed to Adjunta, under the orders of Government at the recommendation of the Parent Society, that the aid and assistance of the Society be offered to him, and that he be requested to communicate to the Society such observations on the Temples of the Hindoos, as may in his judgment be deemed worthy of notice in the Society's Journal.

At a Meeting of the Managing Committee of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, on Friday Evening, the 20th December, 1844.

Read two letters from Messrs. Wm. H. Allen and Co., dated 9th September and 7th October, 1844—advising the despatch of books per the *John Line* and the *Emerald Isle.*

Read the following letter from the Secretary to the Bombay Geographical Society.

No. 51 of 1844.

To

The Secretary to the Literary Society,
Madras.

SIR,

I have had the pleasure at the Quarterly Meeting of this Society, held on the 7th Instant, to submit the work entitled "Madras Journal of Literature and Science, edited by the Committee of the Madras Literary Society and Auxiliary Royal Asiatic Society, June, 1844, No. 30," forwarded by you for presentation; and I am directed to convey to you the best thanks of the Society, for your very acceptable donation.

GEOL. SOCIETY'S ROOMS,
Town Hall, Bombay,
15*th November*, 1844.

I have the honor to be, &c.
(Signed) GEO. BUIST,
Secretary to the Society.

Resolved,—That the following books be ordered out from England for the Society.

The North British Review.
Cuvier's large Work "Les Ossemens Fossiles," second-hand copy.
Arago's Lives of Herschel and Watts.

Resolved,—That a letter be addressed to Messrs. Wm. H. Allen and Co., with reference to their letter of the 26th June last, on the subject of the Linnæan Transactions to the effect of the note on the Proceedings of the last Meeting.

Resolved also,—That Messrs. Wm. H. Allen and Co. be requested to inform us of the price of "Agassiz's Works."